Economically and academically disadvantaged young people striving to be computer literate in Mozambique: Unfolding learner agency in constraining conditions

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COMPULSORY DECLARATION

This work has not been previously submitted in whole, or in part, for the award of any degree. It is my own work. Each significant contribution to, and quotation in, this dissertation for the work, or works, of other people has been attributed, and has been cited and referenced.

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Signature Date

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Abstract

Although Information and Communication Technology (ICT) has an empowerment and social inclusion effect in developed countries, it continues to create a digital divide in developing countries. This thesis is premised on the argument that, despite the disjuncture between ICT, social-cultural and developmental needs in a developing country, computer literacy training should continue to be offered and young people from economically and academically disadvantaged backgrounds endeavour to acquire computer literacy skills. The objective of this study is to answer the question "Why do economically and academically disadvantaged young learners choose to engage with ICT and what role do they see for computer literacy?" Thus, the purpose of the study is to unfold learner agency in constraining conditions.

The study adopts a theoretical frame of activity theory and Archer's perspectives on a *modus vivendi* and her trajectory 'concerns > projects > practices' to explore the various dimensions and levels of contextual constraining conditions and learner agency. The concentric model is used to situate the activity system in a broader context of the computer literacy course and serves as an analytical framework too. The research took the form of a case study of 26 economically and academically disadvantaged computer course participants from a vocational training centre, located in a high-density suburb of the second biggest city in Mozambique. A mixed-method approach was applied, drawing on a structured questionnaire, which then led to the purposeful selection of 5 participants for semi-structured interviews, and a follow-up focus group.

Findings show that students have a positive technology identity, augmenting their keen interest in further engagement with ICT. They are confident, act strategically and make sacrifices in order to achieve their aims of becoming computer literate, hoping that it will enable them to be better positioned to gain future employment and therefore achieve a positive change in their lives. The analytical link between 'motive/object and outcome' helps to unfold the construct of learner agency in the context of acquisition of computer literacy.

This thesis provides empirical evidence on young people's 'real life' ICT experiences in a context that is largely under represented. In doing so, it encourages a more positive view of the urbanised African youth as source of energy and talent. It also makes a useful theoretical contribution by situating of Activity theory and Archer's concept of *'modus vivendi'* within a concentric model that enables examination of both the macro and micro elements of social structure.

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Glossary

The following acronyms are used in the text:

AT	Activity Theory
AS	Activity System
CHAT	Cultural-Historical Activity Theory
GoM	Government of Mozambique
GDP	Gross Domestic Product
HDI	Human Development Index
ICT	Information and Communication Technologies
ICT4D	ICT for Development
LDC	Least Developed Country
MDG	Millennium Development Goals
MT	Metical (Mozambican currency)
NGO	Non-Governmental Organisation
PRSP	Poverty Reduction Strategy Paper
SEG	Socio-Economic Group
TV	Television
USD	United States of America Dollar
Web2.0	Second generation of the World Wide Web
ZPD	Zone of Proximal Development

Chapter 1
Introduction

Information and Communication Technologies (ICT) connect all parts of the 'world' to each other, and their contributions to empowerment and social inclusion are not only acknowledged internationally, but can also be witnessed increasingly within the African context. Part A of this chapter introduces the context of this research, viz. the unfolding relationships of computer literacy and participation in a so-called knowledge society, as well as learner agency in constraining conditions. Adopting a 'critical' approach, Part B informs about the situated development context, acknowledging clear linkages between the individual and situated 'real-life' contexts. Building on this context-rich description, Part C gives an overview of the purpose and process of the study.

Part A – The context of the study

Embedded in the premise that education is a human right that enables people to improve their lives and transform societies, the call for global partnerships (UNESCO, 2008) to make available the benefits of new technologies – in particular ICT – provides the broader context to explore the field of digital literacy practices of young people in a least developed country, such as Mozambique.

Gómez-Estern, *et al* (2010) see literacy as a crucial factor in the process of socialisation in a specific cultural setting and through participation individuals can acquire new forms of mediation tools. Gómez-Estern, *et al* thus state that, "through the literacy process the person will purchase new instruments that will change her (his) relationship with her (his) new socio-cultural and cognitive environment" (2010:237). However, in the age of digital technology, our understanding of literacy – and specifically computer literacy – needs to be considered against the prospects and challenges of ICT, and our knowledge of learning and educational practices.

The term 'computer literacy' itself – often focused primarily on technology based definitions, concepts and skills – has changed over the decades due to advances in technology (Creighton, *et al*, 2006). Consequently, a range of definitions of new literacy forms, like digital literacy, information literacy (Hignite, *et al*, 2009) or internet literacy (Livingstone, 2008), have begun to dominate in more recent research that is oriented towards a higher-level set of concepts and abilities.

Nonetheless, computer literacy continues to be vital for participation in a knowledge society. Selwyn (2005) assumes the ability to use a computer to be a cornerstone of effective citizenship in the

information age. She highlights the need to encourage people to become competent with ICT, considering the range and social stratification of formal and informal learning about computers. One needs to be aware that introducing computers in a particular setting with certain results in mind, means entering in "situated social practices that do not necessarily result in these resources being used in a way that promotes social development and participation" (Snyder and Prinsloo, 2007:171).

In relation to the social practice of literacy, Warschauer (2002) examines the unequal distribution and practice of literacy in the context of debates over a 'digital divide'. Castells (2000, in Ngugi, *et al*, 2007:51) highlights, at a macro level, both the risks of poor countries continuing to be threatened with structural irrelevance because of their technological obsolescence, as well as the opportunities of allowing them to leapfrog beyond the industrial stage in their process of development. Likewise, inequalities in use and access to ICT are also phenomena within nations and regions (Looker and Thiessen, 2003) and are strongly patterned along lines of socio-economic status, income, level of education, age, geography, and ethnicity (Warschauer, 2003). Digital divide logic often "overemphasises the importance of the physical presence of computers and connectivity to the exclusion of other factors" (Snyder and Prinsloo, 2007:174); such factors are specified by Warschauer (2002) as issues of content, language, education, literacy, or community and social resources, and the risk is that complex relationships and differentiated situated digital practices will be simplified for meaningful use.

However, access to technological resources remains a major challenge in developing and least developed countries (Mutonyi and Norton, 2007). Nonetheless, it is worthwhile to mention that while ICT use is constrained by a lack of access, it is not necessarily enabled by access (Czerniewicz and Brown, 2009).

In practice, social inequalities and social conditions are often responded to by linear, determinist approaches, which assume that creating enabling conditions will automatically change actions. This is not necessarily the case (Czerniewicz and Brown, 2009). Drawing on the positions of social realists and critical realists, Goode (2010:3) suggests a more innovative theoretical and methodological approach that involves studying the digital divide to explore "how formative experiences and social context influence skills and attitudes toward computing", capturing "the holistic picture regarding the influence of the digital divide at the individual level". This demands "acknowledging the clear linkages between educational technology use and macro elements of the social structure of society", and "similarly, at the micro level of the individual, the act of technology-based learning needs to be understood as being entwined with many other dimensions of social life" (Selwyn, 2010:68).

Young people's digital technology use may be viewed as a negotiated social and literate practice; however, their use of ICT flow across different spaces, such as school, home and community makes simple distinctions about use in each domain problematic. They refer to Bourdieu's theoretical concept of *habitus* (discussed in Chapter 2) and suggest that "texts, meanings and practices do not emerge wholly from one social/physical domain but are traced and sourced from the whole life world of experience" (Bulfin and North, 2007:247). The flow and relationships between a range of spaces in the context of ICT, and the practices they encourage and afford, need to be framed within a critical understanding of the everyday practices of young people.

In order to understand how ICT can be used successfully and effectively, it is important to investigate how people learn to use computers, how different forms of learning contribute to people's eventual use of ICT, and "crucially, how this learning fits into the wider social contexts of people's everyday lives" (Selwyn, 2005:122), as stratified along social lines. Snyder and Prinsloo (2007:171) refer to "the complex ways in which young people's lives are entangled with digital technologies" but argue about "yet insufficient theoretically informed empirical research … to examine how they use them and with what impact". This seems important, as "formally learning to use a computer does not lead to using a computer (and therefore increase engagement in the information age)" (Selwyn, 2005:134).

By focusing on a specific socio-economic group (SEG) – economically and academically disadvantaged young people[1] striving to be computer literate – this study investigates their ways of learning and using ICT. From a holistic perspective, it also examines whether their use of such technologies contributes to better social inclusion. Indeed, investigations into the practices of young people in their context gives insight not only into how they learn and use a computer and, more generally, ICT, but also into how they think about opportunities, reasons, and needs to use computers.

Part B – The development context

Acknowledging clear linkages between the individual and situated 'real-life' contexts, this section informs about the situated development context. This contributes to a context-rich understanding that looks beyond issues of learning (Selywn, 2010:66) in the sense of the disputed "issue of

[1] The nationally accredited vocational training centre, where the study took primarily place, defines 'economically and academically disadvantaged young people' in line with multilateral (MDG) and national guidelines (PRSP) regarding poverty and human development (see also 4.8).

causality, that is, whether literacy enables development, or whether unequal development (and corresponding unequal distribution of political, economic and social power) restricts people's access to literacy" (Warschauer, 2002:7).

1.1 Mozambique: A least developed country struggling between globalisation and poverty

Mozambique[2] is ranked among the least developed countries (LDC) on earth and nearly half of its population of about twenty-one million people[3] live in conditions of absolute poverty[4]. Since the introduction of a poverty reduction strategy plan (PRSP)[5] in 1996, the Government of Mozambique has been coordinating its poverty alleviation measures with the international donor community, based on the Millennium Development Goals (MDG)[6]. However, this partnership is highly dependent on donors. Although poverty reduction efforts have been aimed at promoting rapid and broad-based growth with a focus on rural development, investment into social service and infrastructure sectors, the rural incomes of the poorest part of the population continued to decrease from 2002 to 2008 (Cunguara and Hanlon, 2009:10). Only 10 per cent of the workforce is formally employed, leaving the vast majority dependent on subsistence farming and activities in the informal sector. The formal educational sector is in a similarly bad state. With a teacher-pupil ratio of 66 pupils per teacher and a high enrolment rate of more than six million pupils in primary education, and nearly 1 million pupils in secondary schools (a figure that has tripled in the last six years since 2004), there is a serious problem of a very high failure rate in the exams, especially in the first half (grade 10) of secondary education (Hanlon, 2010a). Consequently, due to high drop-out rates and the reduced knowledge and skills transfer, many young people find themselves on their own in their search and struggle for a better life (MARP, 2008).

However, Mozambique is not cut off from the influences of globalisation and regional integration, which include the rapid expansion of ICT. Beside governmental macro-policy measures and increased spending on service delivery in the social sectors of education, health and basic infrastructure, most people urgently need knowledge and skills to participate successfully in the development process to improve their lives. However, the opportunities offered by digital technologies – with the exception of the rapid expansion of mobile telecommunication – are yet to benefit the majority of the population and young people attending formal education and vocational training in particular. In addition, little information is available at a local level about the motives and

[2] The country ranks 172 out of 179 countries listed in the Human Development Index. Source: HDI/UNDP, 2009.
[3] The population based on estimates of the National Census 2007. Source: INE/GoM, 2007.
[4] 49 per cent of the population is classified as living in absolute poverty. Source: HDI/UNDP, 2008.
[5] The recent PRSP (PARPA) is presently in its third phase (2006-2010). Source: PARPA/GoM, 2007.
[6] The Millennium Development Goals are a global action plan to achieve eight anti-poverty goals by 2015. Source: [Online] Available: http://www.un.org/milleniumgoals/.

experiences of young people's engagement with ICT as they undergo formal education, or look for related training opportunities.

1.1.1 The people, poverty and mobility

An increasing and steadily younger population, coupled with higher mobility and a gradual shift from rural towards urban areas, creates new challenges for a nation that is seeking to achieve peace, stability and democracy as the foundation for benefiting from development and regional integration.

The recent so-called 'food riots' in four major cities[7] in September 2010 (Hanlon, 2010b), the worst incident since the worldwide food crisis in 2008, were a serious sign of the challenges ahead and the complexity faced by a least developed country like Mozambique in a changing society and a globalised world. Thousands of mostly young people in sub-urban areas protested against the increasing costs of living, invading streets, looting shops, and fighting police and rapid intervention forces that left some people dead.

An aspect that was new during these riots was that text messaging (via mobile phones) was used extensively, especially among the younger generation, while engaging in protest actions. Within two days, the government ordered the two mobile telecommunication operators in the country to shut down their messaging services temporarily, and informed the public of an investigation aimed to identify the person who sent the 'first' text message of 'mobilisation'. In addition, a legislative bill was recently introduced to register the identities of all pre-paid mobile phone users.

1.1.2 The arena: ICT, youth and digital literacy

These recent happenings are only one example of the importance of increasingly affordable and ubiquitous telecommunications. They should not cause a setback for the positive opportunities of this industry to help millions of users to earn a living, nor should they jeopardise its contribution to social cohesion. Instead, these events should make people aware of the need for a more critical and contextual approach to research (Selwyn, 2010) around the information age, the importance of development, and the engagement of individuals with ICT in constraining conditions.

[7] Spontaneous riots after significant price increases for basic goods like bread, water, energy and petrol occurred on September 1-3 2010 in the cities of Maputo, Matola, Chimoio and Tete; 4 to 11 people died in confrontations with rapid intervention police (Hanlon, 2010b).

It is about understanding the potential of the youth in a country like Mozambique. It is about active participation based on consciously taken decisions by individuals in their situated context. It is about technological identity and digital literacy, which are necessary to take part in the knowledge society.

Such an approach necessarily leads to questions around the so-called 'digital natives' (Prensky, 2001; in Warschauer, 2003) and the 'digital divide' (Warschauer, 2002; Czerniewicz and Brown, 2005), with the latter issue addressed throughout the following chapters. Lastly, the research concentrated on the authentic experiences and perceptions of young learners, who were attending a basic computer course on their own initiative, in order to investigate their motives and expectations, and what either enables them to become computer literate or constrains them.

Living for more than a decade in the city where the field research took place and drawing on my professional working experience in development cooperation and higher education, gave me as a researcher the confidence to identify and select the right setting to provide the arena for the field research. My personal experience in designing innovative, interdisciplinary learning activities that incorporated scientific and everyday concepts represented an additional motivation to conduct this research among young people who were investing both time and resources in learning more about ICT.

Given the selected research field, namely, investigating what drives economically and academically disadvantaged young people in Mozambique to become computer literate, a more holistic and critical approach must include a range of contextual issues beyond learning (Biesta, 2006, in Selwyn, 2010:66), such as political, socio-cultural, economic and technological dimensions. After all, Mozambique is not cut off from the impacts of globalisation and the rapid expansion of ICT.

1.2 One social world

The concept of 'digital natives' suggests that more and more young people are regarding themselves as "children of the 21st century", familiar with modern technologies and "seeing the world through a more global lens" (Mills, 2010:237). This situation calls for "21st century skills" (Facer and Sandford, 2010:74). Much has been said and written about the shift from the industrialised society towards the information and knowledge society that is accompanied by improved communication solutions and a greater global orientation (Friedman, 2005). But what does that mean for the individual person, and more importantly, how does it affect everyday life in any given context?

The spread of advances in ICT have increased the spread of globalisation. Access to these rapidly developing technologies and applications, and consequently, access to and use of information itself, are not only driving innovation and change, but also enhancing productivity and competitiveness in a global market (Mills, 2010). Imbalances in this respect will affect knowledge production and reproduction, for individuals and societies, and this in turn will put pressure on traditional formal education systems, forcing them to change and adapt.

To conduct a successful investigation that does not neglect the broader structures of global, regional and national connections and their impact on individual contexts, a concentric or ecological model (Lim, 2002; Cole, 1995) was chosen as a theoretical lens to identify and highlight relevant issues and relationships between the macro and micro levels. The aim of the study is to understand the links and relationships between the direct social environment at the micro level and the macro level, which condition one's life within a broader social context and even on a global dimension with regard to development.

1.3 The dimensions of development

Global orientation and instant availability of information are only two signs of a shift towards a knowledge society that replaces our conceptual view of knowledge – static, organised, and defined by experts – by a more dynamic and multi-faceted view (Siemens, 2006). However, as with other major changes in society, this is not happening at the same pace, or simultaneously across the globe, or in the same form everywhere. Such changes are shaped by countries' cultural and historical backgrounds (Engeström, 1987; Vygotsky, 1978). Still, in such a societal change there is a global need and a human obligation to assure that knowledge is transmitted in non-discriminatory and valuable forms (Selwyn, 2010).

While development contributes to knowledge production and reproduction as the interplay between society and individuals, different levels of knowledge in turn influence development. It is in our interest to create a better relationship among knowledge, education and economic development. Imbalances in economic growth and population growth have implications for production, distribution, exchange and consumption; these realities are also relevant in a knowledge society, with Africa as the continent that encounters the biggest challenges. Africa's population is growing faster than the average of the world's population, with lower educational access rates and the majority expected to live in poverty. In addition, most African countries have a population that is less than 25 years old.

In Mozambique, by 2025 about half of the population will be under the age of 15 years[8]. Those young people will desire a life without poverty, but their chances of achieving that depend significantly on growth opportunities for job creation and income generation, and on having the necessary knowledge, skills and information to inspire their creativity and initiative. But as reported earlier in this chapter, poverty may hinder such aspirations and condemn them to a daily struggle for survival. It is for precisely this reason that political, socio-cultural, economic and technological dimensions need to be taken into consideration to produce more 'context rich' analysis (Selwyn, 2010).

1.4 Including macro and micro perspectives within a situated research focus

Being computer literate is vital across the globe for participation and social inclusion (Selwyn, 2005). The acquisition of such digital skills – be it formal or informal – is up to the individual. The focus of this research, viz. economically and academically disadvantaged young people attending a computer literacy course is thus an ideal opportunity for investigating learner agency in the context of constraints and constraining conditions.

However, in the interests of a holistic and more critical theoretical and methodological approach to study learner agency in constraining conditions, a frame is needed that captures the range of issues that go beyond an access and skills perspective (Warschauer, 2002) as well as beyond learning (Selwyn, 2010).

A 'concentric' model (Lim, 2002; Cole, 1995) is not only a way of reflecting on broader contexts in a holistic and theoretical manner, but it also allows to accommodate Engeström's (1987) model of Activity Theory (Engeström, 1987) in a broader context, as represented by different levels of successive circles (Bronfenbrenner, 1979).

Such a holistic approach not only allows one to track the steps that lead towards the core research issue but also provides the opportunity to get closer to the individual human being in a real life situation, which impacts not only on the particular activity under investigation, but also produces the enabling and constraining conditions that impinge on the individual to turn objectives into outcomes. In this respect, Archer (2003) provides a nuanced approach to agency and structure that helps in making sense of the way young learners exhibit a more complex and nuanced way of engaging with, and making considered decisions about using technology (Czerniewicz, Williams and Brown, 2009).

[8] Population in Mozambique, 0-14 years: 47.2%. Source: [Online] Available: http://www.ine.gov.mz/censo2007/.

Hence, the overall conceptual framework incorporates the dimensions of development perspectives at macro level, which directly or indirectly influence individuals, thus creating either enabling or constraining conditions. The theoretical framework used herein allowed me to create a realistic picture of the local context relating to the research problem and in turn to define the objectives of this study and thus to pin-point the research questions.

Part C – An overview of the research process

Against the background of computer literacy and learner agency (Part A), and a context-rich description of the development context (Part B), Part C gives an overview of the purpose and process of the critical approach used in this study.

1.5 From the contextual research problem to pin-pointing specific research questions

The concentric approach was helpful in locating the research focus, which was represented in the form of an activity system, in its broader context, as expressed in the following issues:

- The population in Mozambique is growing with a shift towards more young people and more people living in urban areas;
- Poverty remains the main challenge for both the majority of citizens and the government, with the MDG set for 2015 serving as a psychological milestone;
- Macroeconomic growth (GDP) alone does not create sufficient employment for a growing number of job-seekers in a modernising formal sector that is competing for regional integration and that is dependent on education and skills;
- Formal basic education, including vocational training, struggles to provide quality education for all citizens, and ICT is taught mostly in theory rather than in practice;
- Mobile telecommunication (ICT) is expanding its coverage and services and the number of subscribers is steadily increasing.

In response to the above, what are young people in Mozambique doing to improve their lives? Given the attraction, availability and affordances of ICT for individual use and interaction, as well as the ever increasing presence of ICT, their combined potential for innovation and change lead to the following formulation of the research problem:

- Young people are in urgent need of knowledge and skills – in particular related to ICT – that are essential for successfully participating in the country's development and for increased productivity and competitiveness to earn a living, or at least to participate in their social environment.

So far, there is little reliable information available in the local context (Snyder and Prinsloo, 2007), and thus this study seeks to investigate young people's experiences related to ICT, particularly in constraining conditions.

1.6 Research objectives

The objective of this study was to investigate the perceptions and experiences of young learners striving to be computer literate, as well as to analyse and reflect on learner agency in constraining conditions. The vast majority of the participants in the study were attending a basic computer literacy course at a local non-governmental vocational training centre in Inhamizua, a densely populated suburb, located on the outskirts of Mozambique's second biggest city, Beira. The training centre targets economically and academically disadvantaged young people 15 to 25 years old, coming from a diverse cultural and socio-economic background. Attending such a computer literacy course is a conscious decision to engage in a structured learning activity outside the public education system.

In addition to the general objective of this study to gain insight into the complex relationships that affect young learners in a least developed country like Mozambique, specific objectives of the study were:

- To describe and explain user experiences of ICT;
- To describe participants' motives to engage in a computer course;
- To describe and relate their perceptions and expectations to what extent their engagement is linked with their plans;
- To describe and explain key moments in the individual learning process regarding the expected outcome of computer literacy, or in a wider sense, of 'digital literacy';
- To provide helpful insights regarding participants' self-awareness and identity;
- To provide findings that would serve as qualitative input for other stakeholders to improve existing, or design new learning activities around ICT.

1.7 Research questions

The holistic approach, supported by the concentric model, contributed to increased cohesion between the research problem, the research objectives and the research questions. As a result, the research questions were structured into an overall question and four specific questions:

Why do economically and academically disadvantaged young learners choose to engage with ICT and what role do they see for computer literacy?

- What are the prior experiences of young computer course participants with ICT and why do they engage with such technologies?
- What are the individual perceptions and expectations of young disadvantaged learners regarding their engagement in a computer literacy course?
- What motivates them to engage in the structured learning process to become computer literate, and what discourages them?
- How do they see newly acquired basic computer literacy helpful for their further engagement with ICT and for their individual plans?

Although these specific research questions merely provide a 'snap-shot' of a complex real life situation, their structure mirrors the individual developmental path in a context over time. Accordingly, the research provides insight into individuals' experiences with ICT, their beliefs and attitudes towards such technology, their motivation for attending such a computer course, their collaborative learning experiences in seeking to become computer literate, and lastly, the contribution of such courses to their life-projects and goals.

1.8 Linking the rationale and research questions with the theoretical framework

As mentioned earlier on, one strength of a holistic and more critical socio-cultural approach is that it rejects the view that ICT can be studied in isolation, arguing instead that "it must be studied within the broader context in which it is situated" (Lim, 2002:411). This affects positively the process to refer to suitable theoretical and analytical concepts, draw up a theoretical framework, and define methodological choices.

Taking a computer literacy course is a conscious decision to engage in a structured learning activity. Looking at a computer course as an activity system, Engeström's (1987) second generation model of

'Activity Theory' (AT) provides an appropriate analytical theory and tool to analyse the learning activity, by looking at contradictions and looking for notions of expansive learning (see Chapter 2 for explanations of these concepts).

Computer course participants (the subjects of the study) learn and practice with a more experienced instructor, thus allowing learners to link abstract knowledge to their lived experiences for purposeful use. Vygotsky's (1987) Zone of Proximal Development (ZPD) and Lave and Wenger's (1991) concepts of 'communities of practice' and 'situated learning' further allow us to understand, analyse, or explain findings.

In accordance with a more holistic understanding of young people in their context in a least developed country like Mozambique, Bronfenbrenner's (1979) model of an 'ecological systems theory of human development', with its nested environments, enables links between the various levels to be identified. A similar 'concentric' model was used by Lim (2002) to represent the activity system of an ICT-based lesson in a broader educational context. In addition, Archer's (2003) perspectives on a *modus vivendi* and her trajectory of 'concerns > projects > practices' are helpful to understand the subjects under investigation within a broader context, to investigate at the micro level of the individual what ultimately drives young learners in constraining conditions.

1.9 Research design and methodological choices

From the research point of view two related issues were of importance: the first was to gain a better understanding of the individual in his or her context, by investigating a selected sample of young learners as 'active agents' and identifying their concerns, which informed their personal projects (Archer, 2003) and their desire to develop some kind of 'digital literacy'. The second issue, with reference to the concentric model, was to locate the particular situation of disadvantaged young people striving to be computer literate in a wider critical development context that emphasises social justice and poverty reduction. The term 'critical' in this context refers to arguing for empowerment and change.

To compensate for the lack of related empirical work in this specific setting, and based on my own professional experience in development cooperation regarding a contextual and practical understanding of disadvantaged people in least developed countries, an exploratory strategy in combination with a mixed-method approach (Johnson and Onwuegbuzie, 2004) was considered most appropriate. Given the objectives of the research, the dominant qualitative part focused on the micro perspective to unfold learner agency in constraining conditions and explore the real-life

situation of individuals, by contextualising and understanding their personal experiences, perceptions and expectations. The quantitative part was designed to provide some baseline information to sustain findings in a wider social development context regarding youth and ICT.

The fieldwork was based on a two-fold strategy conducted in three phases. Phase 1 studied 26 computer course participants by means of a structured questionnaire and led to the purposeful selection of 6 participants of Phase 2, who participated in semi-structured individual interviews. Thereafter, 5 of the participants in Phase 2 took part in a final group meeting (Phase 3) to conclude the fieldwork. Using different methods for the three phases of the fieldwork validated the data collection process.

To link the research questions and the concentric model used in the theoretical framework (see Chapter 2, 2.9), all three phases were structured according to interrelated themes throughout the methodological and analytical approach. This integrative approach was also maintained in the chapters presenting the findings and the discussion.

1.10 Data analysis

As I adopted a social realist position together with my personal critical notions, the analytical process was used to support 'sense making'. Notwithstanding my holistic thinking, I was careful to deal with an independent reality that never can be fully apprehended and that might be potentially misleading. Building on my own beliefs and positions, the objective throughout the study was to develop more "context-rich accounts of the often compromised and constrained social realities of technology use on the ground" (Selwyn, 2010:66).

The rich data generated by the mixed method approach of studying purposefully selected interview partners from a disadvantaged SEG of society, suggested that it would be valuable to consider a combination of activity theory analysis (to look into contradictions in the activity system), and content analysis (to be sensitive towards language and meaning in context). Activity theory, as an analytical tool, has a built-in link of motive/object and outcome (Engeström, 1987), which bridges the elements of Archer's (2003) trajectory 'concerns > projects > practices' and the concept of a *modus vivendi*. Both theoretical concepts are essential, firstly, to understand better the practices of active agents in constraining conditions, and secondly, to clarify why agents act strategically.

1.11 Findings, discussion and conclusions

Although the findings and the discussion (Chapter 4) and the conclusions (Chapter 5) are presented in two separate chapters, they together represent an 'arena of causality' within specific contexts, drawing on theory and based on the conceptual framework. To make sense of how and why young people are striving to be computer literate, or even more practically, why they choose to attend a basic computer course, their 'micro-worlds' must be understood in the context of their wider social milieu (Goode, 2010).

As a result, my strategy of how to structure and present the outcome of my fieldwork in order to present their stories was influenced by my choice of particular interviewees from a disadvantaged SEG of society. Prominence is given to these principal actors to stay as close as possible to their authentic contexts. The authenticity is represented through agential stances in the discussion, to assure that the conversation does not drift away from the ground. The conclusions highlight the key findings in review of the research questions.

1.12 Structure of the dissertation

Chapter 1 Part A has presented the reasons for this specific study, explaining the relevance of studying the constructs of literacy and social inclusion, as well as learner agency in constraining conditions, within the context of the knowledge society and the digital divide. Part B has contextualised the constraints by referring to the macro and micro dimensions in relation to local conditions, concerns and opportunities. Part C has outlined the path from the research focus, the problem definition and formulation of the research questions, the theoretical framework to capture the broader context, the methodological choices and its analytical implementation, to the logical structure of findings, discussion and conclusions.

Chapter 2 Part A reviews in detail specific theories that informed my conceptual and theoretical understanding, as well as their conceptual arrangement. Following a socio-cultural approach and applying an activity theory's perspective, the aspects of learning and development are followed by an introduction of concentric models, providing a frame to situate an activity system in a broader context. Archer's nuanced approach on agency and structure is presented around her concepts of reflexivity and a *modus vivendi*. As there is limited empirical work available in this field, it is important to investigate it further in Mozambique or other sub-Saharan least developed countries, using core literature around the role of ICT in development and related research regarding access and use; this

is addressed in Part B. Part C of Chapter 2 sums up the literature review to draw together the key ideas that form the basis for the theoretical framework.

Chapter 3 provides a detailed account of the research process, led by a two-fold strategy that combines a mixed method design, using different methods for the three phases of the fieldwork and breaking down each phase into interrelated themes, linking the research questions with the concentric model. A systematic description of the fieldwork sets out how the activities developed on the ground. This is followed by a description of the data analysis process.

Chapter 4 follows the two-fold approach and presents in Part A the findings, building on the dynamic created by the three phases of the fieldwork and linking the thematic structure to the broader context, as represented by the concentric circles of the theoretical framework. The discussion (Part B) reviews the findings in terms of the theory and prior empirical research, to inform to what extent the analysis contributed to answering the research questions.

Chapter 5 Part A summarises the key findings according to the original research questions by reflecting on learner agency regarding computer literacy in a broader context. Part B reviews the research process, including its limitations and recommendations, with the intention of encouraging further research that contributes to developing scientific accounts of the often compromised and constrained realities of education technology use.

Chapter 2

Review of concepts, theories and research studies

Part A gives an overview of fundamental theories and concepts relevant for the theoretical framework, Part B reviews recent empirical research that contributes to the field of research in a critical or innovative form, and Part C sets out how these theories and conceptual frameworks informed my integrated theoretical approach.

Part A – Relevant theories and concepts

Although the aim of the study is to investigate how individuals describe and explain their motives, perceptions and expectations, and thus how agency interacts with structure, theoretical assumptions anchor the study in the real social world. Concepts of social theories need to be analysed against today's practices and challenges – societal constraints – to give meaning to an academic exercise like this. Cognitive development of the individual in terms of learning and developmental theories needs to match the situational context of an individual within a developmental context of poverty to make sense: mastering and contributing to change and development.

2.1 Learning and development from the perspective of activity theory

Although learning and development are distinct psychological processes, the relationship between the two is fundamental for how we construct our understanding around organising and guiding development. Vygotsky (1978), influenced by the cultural-historical changes in Europe that saw the rise of socialist-Marxist schools of thought, elaborated on operations in the form of the notion of mediation, concluding that the development process follows the learning process. Or in other words, a function emerges first at the interpersonal level between the individual and other persons, before it appears as an intrapersonal function (Kaptelinin and Nardi, 2006). His work on the zone of proximal development (ZPD), as the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers (Vygotsky, 1978) not only inspired a continued development of these theoretical concepts, but also provides a pedagogical concept to put theory into practice.

2.1.1 Teaching within the ZPD

Building on the concept of the ZPD, learning in developmental terms only happens in the space between the lower and higher levels of an individual's ZPD. Pedagogy based on such principles uses "a structured process whereby a culturally more experienced peer or teacher uses cultural tools to mediate or guide a novice into established, relatively stable ways of knowing and being" (Hardman, 2008:65). Hedegaard (1998) refers to a 'double move' between the student's experience and their exposure to theoretical concepts.

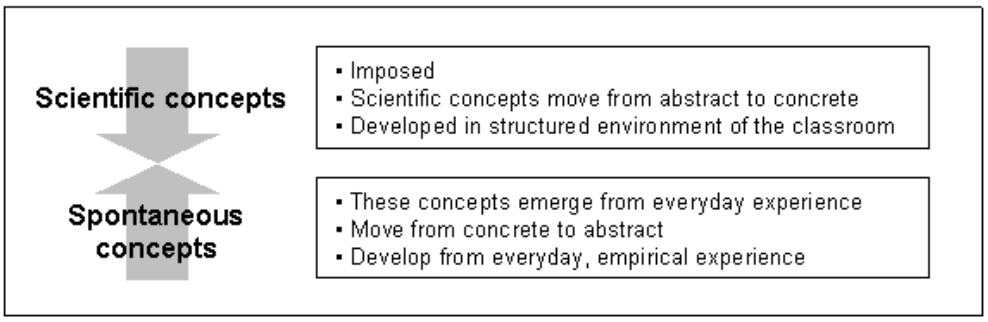


Fig. 1 – A graphic description of scientific and everyday concepts. Adapted from Daniels (2001:7)

Linking this understanding with my study field and a holistic approach, the ZPD also can be seen as the "distance between the everyday actions of individuals and the historically new form of the societal activity that can be collectively generated" (Engeström, *et al.*, 1999:4). This definition, supported by Figure 1, leads to a process of social transformation that "involves the study of learning beyond the context of pedagogical structuring, including the structure of the social world in analysis, and taking into account in a central way the conflictual nature of social practice" (Daniels, 2004, after Lave and Wenger, 1991:49).

2.1.2 Narrow and broad meanings of activity theory

Activity theory was once called a "well-kept secret" by Engeström (Engeström, *et al*, 1999:2), who contributed to its evolution into a versatile theoretical and methodological framework for investigating how human development or learning is shaped by social and cultural-historical factors. Its broad theoretical framework describes the structure, development, and context of human activity (Kaptelinin, Nardi and Macaulay, 1999).

From a narrow perspective, activity itself refers to a subject-object interaction, where a motive is an object that meets a certain need of the subject (Kaptelinin and Nardi, 2006). Recalling that learning

and development is a mediated process, the mediational model (Vygotsky, 1978), also known as the 'first generation activity theory' (Fig. 2) expresses our capacity to influence our own development by using tools or signs (artefacts).

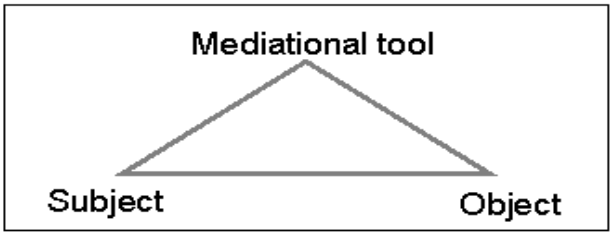


Fig. 2 – The triadic representation of mediation

However, this mediating role of artefacts stays within the limitations set by the instrument, which are themselves being created, developing and transforming, and which carry within them a particular culture (Kuutti, 1996).

The introduction of the socially mediated activity by Vygotsky (1978) pointed towards, but did not develop an analytical framework to accommodate the collective and dynamic nature of activities (Engeström, 1987; Hardman, 2008). It was further developed by Leontiev (1981) in his model of a hierarchical structure of activity (Fig. 3). The hierarchical introduction of levels not only describes an activity as a sequence of steps, but also distinguishes between activity, actions and operations according to their orientation, with the activity driven by a motive in mind.

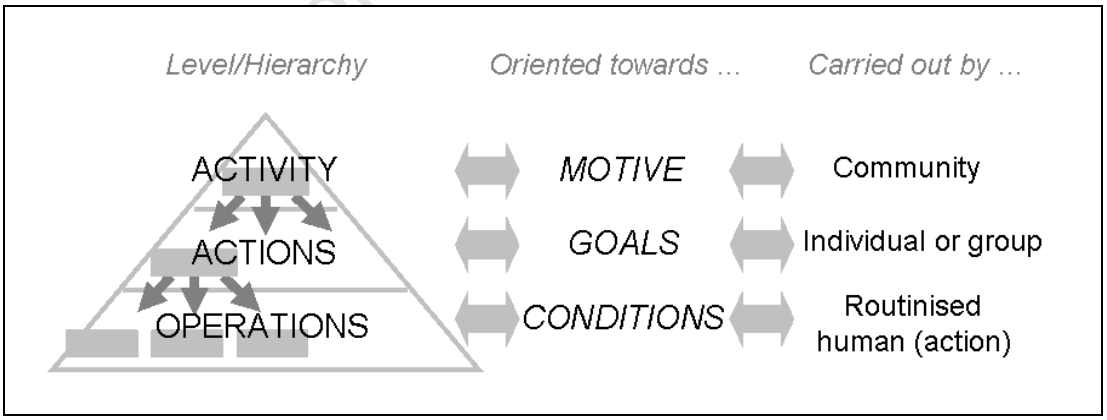


Fig. 3 – The hierarchical structure of activity. Adapted from Kaptelinin and Nardi (2006:64, Fig. 3.4)

The motive driving the young learners at the basic computer course – representing the activity – is to become computer literate. Actions, such as operating a computer to access the internet, are conscious and directed at goals. In a situated learning process, novice actions (which may be difficult

at first) will become automatic or routine operations, like switching on the computer and opening the necessary program.

Based on Vygotsky's work around the ZPD and mediation, Leontiev's work portrayed the individual against the background of a social activity, but stayed short "to situate human functioning in context, illustrating how individual actions are transformed into shared, collective objects through interactions with community members, or indeed, how division of labour impacts on individual actions in a collective activity" (Hardman, 2008:70). Mentioning that Leontiev never graphically expanded Vygotsky's original model into a model of a collective activity system, Engeström (1987) elaborated on the idea of activity systems based on the mediational triangle, adding the components of community, rules and division of labour (Fig. 4).

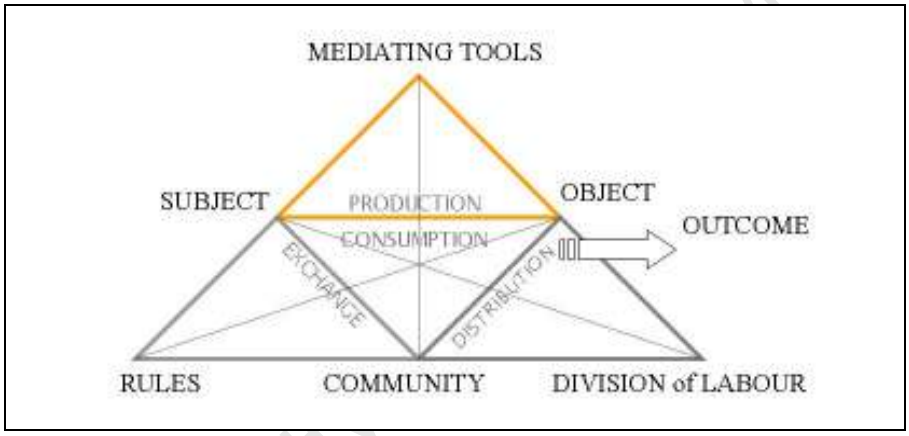


Fig. 4 – The mediational structure of an activity system. Adapted from Engeström (1987:78)

The basic unit of analysis in activity theory is the activity system as a functional system together with the relationships within the system, or as used in Engeström's (2005) third generation activity system between activity systems. Engeström extended the three basic elements, their relations, and the outcome of the activity to give a more representative picture of the essential social relations in an activity system, thus making activity theory more practical for both the researchers and practitioners seeking to understand the expansive dimension of learning.

The introduction of the community component means that the subject is regarded part of something larger, sharing a common motive. The division of labour is another component that allows new views, either from the subject's or the system's position, regarding the "continuously negotiated distribution of tasks, powers and responsibilities among the participants of the activity system" (Cole and Engeström, 1993:7). The rules, as a third additional component, are "the norms and sanctions that specify and regulate the expected correct procedures and acceptable interactions among the participants" (Cole and Engeström, 1993:7).

2.1.3 Basic principles of activity theory

Kaptelinin, Nardi and Macaulay (1999) subsume activity theory by the principles of a hierarchical structure of activity, object-orientedness, internalisation and externalisation, tool mediation, and development. In its current shape of a third generation model (Engeström, 2005), activity theory is summarised by Kaptelinin, Nardi and Macaulay (1999) with the help of five principles:

- two or more activity systems are collectively taken as the prime unit of analysis,
- the multi-voicedness of activity systems to accommodate different views, traditions and interests,
- historicity to reflect the evolution over lengthy periods of time,
- the central role of contradictions as sources of change and development, and
- the possibility of expansive transformations in activity systems.

In this modern form, activity theory offers a set of conceptual tools that is applicable to various situations. It allows a focus on the object, the impact including the 'why' interrogation, the relationship between the individual and the collective, as well as the rules and division of labour within and between activity systems. Its analytical application in complex situations has been used successfully in various scientific fields, as in human-computer interaction (Nardi, 1996), work environment (Engeström, 2005), ICT in education (Lim, 2002; Czerniewicz and Brown, 2005) and pedagogy (Hardman, 2008).

2.1.4 Learning from experience and expansive learning

Having defined the selection criteria for the study sample, the focus is placed on young learners attending a computer course in a vocational training centre for economically and academically disadvantaged young people. As mentioned earlier with regard to the ZPD (Vygotsky, 1978), people learn from and draw on their experiences. This is even more the case in constraining circumstances, for example in a least developed country, where people face problems in formal education, where they have less 'free time' available, and where they face a daily struggle to earn a living, rather than consciously 'educating' their children.

Knowles' (1980, in Fraser, 1995:24) statement that "adult learners do not bring their experiences with them into education; they are their experiences" may be theoretically explained by Kolb's (1984, in Fraser, 1995) learning circle, drawing on its four phases of concrete experiences, reflecting,

generalising, and applying ideas in new situations, as well as that "learning and change result from the integration of concrete emotional experiences with cognitive processes: conceptual analysis and understanding" (Kolb, 1984, in Fraser, 1995:6).

In the context of this study, the young adults' engagement with ICT because of the introduction of mobile phone technology about a decade ago opens up new fields of experience. It was followed by the introduction of internet-supported applications, which most likely increased young people's interest in computer literacy courses.

2.1.5 Between theory and practice: *vice versa*

The Russian school of social theories emphasised the cultural-historical dimension in the development of tools and human beings. Linking this understanding to the study field of Engeström's (1987, 2005) activity theory, provides an analytical focus on activity systems (the computer literacy course in this case). "One of the limitations of activity theory is its narrow view of culture" (Kaptelinin, 1996, in Lim, 2002:416), and thus the inclusion of the Russian school's social theories make it possible to situate an activity system in a broader context.

To illustrate a necessary critical and embedded approach, let us go back of the initial reporting about the 'food riots' this year in Mozambique, when young people allegedly 'mobilised' themselves by using text messages to communicate with each other. Did we witness the creation of new cultural forms through human activity using tools in a form of externalisation?

> Humans not only internalise ready-made standards and rules of activity but externalise themselves as well, creating new standards and rules. Human beings determine themselves through objects (artefacts) that they create. They are essentially creative beings. (Lektorsky, 1999, in Daniels, 2004:127)

It is simplistic to refer to the thousands of young people who participated in those happenings 'bandits' and 'rioters' (Hanlon, 2010b), as they can also be considered as the 'voices of the marginalised and unheard', which gives it a new meaning in the national development process and socio-economic and cultural-historical dimension.

Lastly, for Vygotsky language, or more precisely semiotic mediation, was the major mediating tool in any activity. However, Boag-Munroe (2007:112) refers to Hasan (2005b), arguing that Vygotsky developed no theory of context and what constitutes 'context' may become a "troublesome

question, not least because any answer can take the enquirer into ever-widening circles with increasingly remote relationship to the meaning explored". Engeström (1987) offered some solution to the issue of context when he added another level – capturing the components of rules, community and division of labour – to expand the first generation mediational triangle.

2.2 Ecosystemic models: A context-based approach

When looking into the issue of human-computer interaction over time, a positive shift from a dominant technological to human-centered, and lately towards a context-based understanding, is taking place, putting the interaction between users and mediating tools within the motives, community, rules, and culture of those users (Gay and Hembrooke, 2004). In this regard the application of activity analysis (Engeström, 1987) helps to investigate the mediating role played by cultural artefacts and their transformative powers as mediating devices for communication and learning, thus providing the right model for studying young learners (subject) attending a basic computer course (object).

In other words, these young learners are not only striving to be computer literate at a vocational training centre for economically and academically disadvantaged young people, but they are also living in a least developed country, having their needs, motives and projects in mind. Their daily reality is a constraining condition. Linking activity theory to an ecological perspective makes it possible to examine another viewpoint and conceptualisation how the individual and the environmental systems interact.

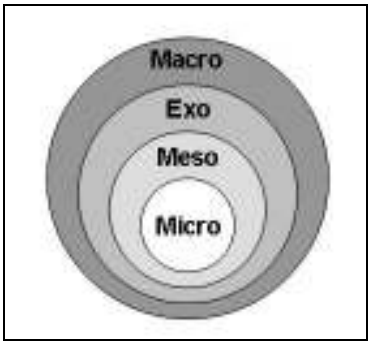


Fig. 5 – Bronfenbrenner's ecological systems model

Bronfenbrenner's (1979) conception of an ecological systems theory for human development (Fig. 5) regards development as a joint function of person and environment, represented in his model as the ecology of nested environments in terms of four levels: micro, meso, exo and macro level.

The micro-system, closest to the individual, includes the immediate pattern of activities, roles and relationships of the individual (the computer literacy course in this study). Meso-systems highlight relationships between two or more settings in which the individual participates, such as the relations between home and school, and between course and work. Meso-systems are encircled by exo-systems, linking with settings outside of the individuals' direct contact, such as the home, the father's workplace or family matters of a close friend. Macro-systems represent the broader social context with particular reference to the developmentally instigative belief systems, resources, life styles, and opportunity structures and patterns of social interchange (Bronfenbrenner, 1979).

In this study, the concentric model thus incorporates the social, cultural, economical, technological and political dimension as either constraining or enabling factors, in relation to the individual's active participation in a context. As such systems do evolve over time, Bronfenbrenner added the chrono-system to expanded this into a three-dimensional model. This was not appropriate for this thesis, and thus Archer's work of agency and reflective deliberations, together with elements of past, present and future, were incorporated instead.

Nonetheless, when looking for interaction and interdependence among the levels from a holistic developmental position, the concentric model is helpful. The advantages of ecological principles of interacting systems (micro, meso, exo and macro) and the integration of activity theory with its object-orientedness make them attractive for researchers in various fields and contexts.

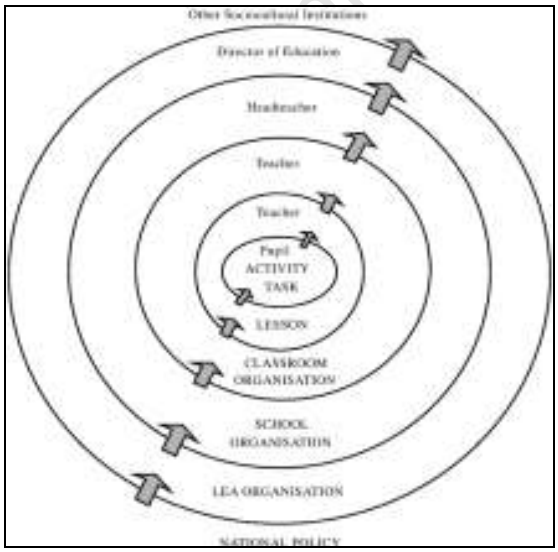


Fig. 6 – Nested context approach. (Daniels, 2004:126, Fig. 4)

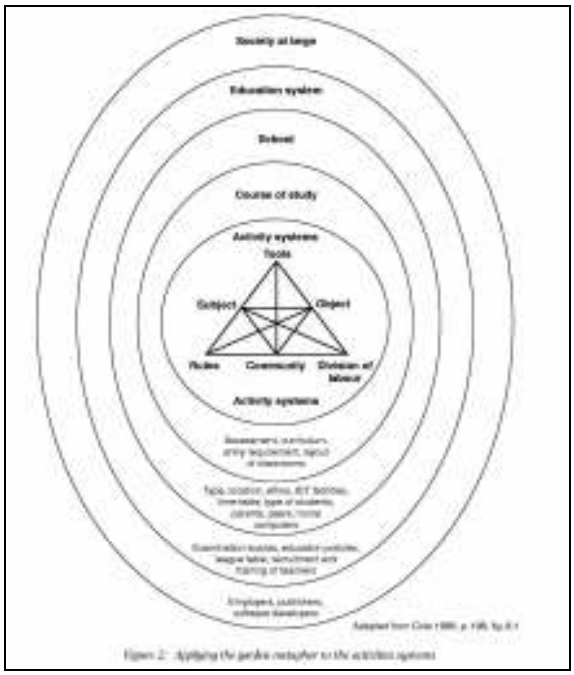


Fig. 7 – Concentric model. (Lim, 2002:417, Fig. 2)

Daniels' (2004:126, Figure 4) adapted model of culture uses the nested contexts approach (Fig. 6) to highlight the fact that context is an actively created two sided process. Looking into the active creation of context in practice or activity means that it becomes a focus of analysis (Daniels, 2004).

Lim (2002) refers to a 'concentric' model (Fig. 7) that places the activity system in a broader context, with each of the circles representing an activity system at a higher level. Whereas activity systems at different levels may change over time, they stay interdependent with changes in such interactive systems sparking from one to the others.

2.3 Archer on agency, identity and being human

The limitations of the formal public schooling system in Mozambique were mentioned earlier as one of the challenges for aspiring young learners. Global interconnectivity not only creates new channels of information, but also opens opportunities for new modes and forms of learning and instruction. It provides a window into the world of knowledge, learning and literacy, with knowledge migrating across borders and institutional contexts.

This global move towards a knowledge society prompts changes in the cultural-historical dimension. With basic public education in Mozambique not expected to change dramatically over the next decade, it will be up to the individual to engage actively in a globally interconnected participatory culture (Francis, 2010). This participation, in the form of producing, sharing and reproducing information, knowledge, and resources will lead to unexpected developments, based on individuals' contributions, interactions and choices across social networks. They may in turn become subjects of social justice.

Building on the concepts of social realism and critical social realism – dealing with the different properties and powers of 'agency' and 'structure' and the interplay between them – offers crucial scaffolds, as they do not deal with it as a one-sided mediation by society, but instead, understand becoming social beings as a conscious process emerging from our embodied practice in reality, based on the individual's temporal priority, relative autonomy and causal efficacy (Archer, 2003). It is the sociality of the individual, built on reflections and actions that make vital contributions to transform society.

2.3.1 Agential evaluation and reflexive deliberations

Archer (2003) refers to agents with distinct properties and powers, and introduces social conditioning to visualise the interplay between structures and agents: how structural and cultural powers impinge upon agents, and how agents use their own powers to act so rather than otherwise in certain situations. In the context of this study, it is of great interest, how structural properties 'impinge upon agents' in terms of 'constraints' and 'enablements'. Or using the words of Archer (2003:5) that "the differential life-chances allocated to those differently situated in society are influential because they assign different opportunity costs to the same course of action".

Knowing more about a learner's identity, or from a holistic point of view, about one's personal and social identities, allows some insight into the active and reflexive nature of 'being human': about his or her practice and sociality. More precisely, it explains what young people do by referring "to agents' subjective and reflexive formulation of personal projects – in the light of their objective circumstances" (Archer, 2003:5).

2.3.2 *Modus vivendi* and the trajectory 'concerns > projects > practices'

Though of relevance, it was not within the scope of this research work to explain the mediatory mechanism of reflexive deliberations, "taken under temporal priority and relative autonomy in situations not of our making" (Archer, 2003:16). However, it did draw on Archer's approach to interrogate how young learners deal with both constraining and enabling factors as they formulate and accomplish their agential projects. The focus was on understanding 'being-with-this-constellation-of-concerns' as a sequenced, individual process of 'concerns > projects > practices', instead of giving detailed accounts of how individuals anticipate and respond strategically to causal powers that have been activated.

Archer (2002) mentions the efforts of human beings to establish a *modus vivendi* through the realisation of satisfactory practices that are subjectively liveable and objectively workable in relation to our bodily well-being, performative achievement and self-worth. This critical approach, which is interested in the interaction over time, the wider social milieu, and the social, cultural, economical and political development aspects, is in accordance with my position regarding social transformation and human emancipation. As a theoretical support to understand all the multiple factors, Bourdieu's notions of social, cultural and economical capital also seemed helpful for my own analytical process.

2.4 Bourdieu's concepts of capital and *habitus*

Bourdieu's notions of access to and accumulation of capital support developmental views as well as the context of the research, as it relates to poverty reduction and the study sample of academically and economically disadvantaged young people. It is true that capital in the societal and developmental terms takes time to accumulate, in either its objectified or embodied forms. And the structure of the distribution, as set of constraints, determines the chances of success for practices (Bourdieu, 1986).

It is important to draw on the fundamental forms of economic, cultural and social capital, and its respective convertibility. Young people paying for a computer course are not only investing in their 'embodied cultural capital'; they also have needs and plans in their mind. Their interests and use of ICT serves not only increases their knowledge, but they also become better connected in terms of 'social capital'.

Bourdieu's theoretical hypothesis regarding the unequal scholastic achievements of young learners from different social classes is helpful in explaining how the interplay of the various forms of capital influences the individual. It also helps to understand the specific context of this study.

> The work of acquisition is work on oneself (self-improvement), an effort that pre-supposes a personal cost (*on paie de sa personne*, as we say in French), an investment, above all of time, but also of that socially constituted form of libido, *libido sciendi*, with all the privation, renunciation, and sacrifice that it may entail. (Bourdieu, 1986:244)

Looking at the study context, the young people spend most of their time trying to satisfy basic daily needs of themselves and their families, which is particularly difficult in a country like Mozambique. As a result, they do not have enough time, money or resources to devote to attending computer literacy courses. This is exacerbated by the fact that the education system is historically poor and over-stretched anyway, and so students need to expend even more time and effort in order to learn these new skills. These conflicting needs create tension, in the individual, in the family, and in society.

The concept of capital is valuable. Examples such as possessing a computer (economic capital), having the knowledge and skills to operate it (embodied cultural capital) and the creativity to produce media in individual or in aggregated form (objectified cultural capital), obtaining a computer literacy certificate (institutionalised cultural capital) to increase one's employability, and

strengthening one's social position as technological knowledgeable person, or increasing one's network of connections (social capital), are all evidence of the multi-faceted possibilities.

The concept of *habitus* can be applied at macro, meso and micro levels (Maton, 2008) and highlights a generative structure through practices. The practices are linked to the underlying principles, or the internal structure, of the *habitus*. Maton (2008) says that one does not 'see' a *habitus* but rather the 'effects' by means of practices and beliefs to which it gives rise; he thus refers to excavating beneath practices to capture its relational structure.

Bourdieu's concept of *habitus* refers to a set of dispositions that are developed over time and within particular relationships in a social context, and that produce attuned, contextual actions. Sayer (2009) describes this in Bourdieu's term, as to develop a 'feel for the game' of our neighbourhood that allows us to feel comfortable in a social situation, whereas he critiques Archer's "reductionist two-stage model of social action, which reduces individuals' first person reflexivity to a set of orientations and dispositions given them by their social context" (Sayer, 2009:120).

The literature also mentions gender issues relating to technological identity and the so-called digital divide. In the fieldwork, the question was thus asked whether women and men used ICT differently. Bourdieu argues as follows with regard to women's access to such technologies:

> Bourdieu conceives the social space of education to be a collection of fields of perception drawn from economics, culture, education and family background. He suggests that our power as agents in this space is increased by the number of positions we occupy in different fields, since the way we write or speak is the product of previous symbolic struggles. Many women students lack experience of the multiple sites of career, work and training. They occupy the domestic space described in their autobiographies and from that base their power in education is slighter than it might be. It is not that these lives are one-dimensional but the multiplicity in that site is not recognised. Women are, therefore, less likely to pass through any educational gate-keeping mechanism which closes off the field of domestic. (Humm, 1989, in Fraser, 1995:38)

Regarding the important role of women in the socio-economic development of their socio-cultural context, a gender-sensitive approach was applied throughout the phases of the fieldwork and data analysis.

Part B – Relevant literature and research studies

There are two different types of challenges during a so-called literature review. The first is related to the issue of theory and practice, raising questions around overcoming theory-practice inconsistencies, and explaining how theory informs practice, and in turn how practice leads to a better theoretical understanding. The latter has become a more burning issue with the emergence of the internet and open resource policies, leading to the manifold production and circulation of research related papers and thus challenging the established ways of presenting, reviewing and acknowledging new scientific concepts.

The second challenge arises by adopting a more 'critical' approach towards the use of educational technology on the ground from the perspective of economically and academically disadvantaged young people in their real life contexts. Understanding the research problem in a wider context and selecting a holistic approach to cover the research objectives is demanding *per se*, but as Snyder and Prinsloo (2007) point out, to date not much empirical research has been published that

- moves beyond a 'means-end' way of thinking to look into the 'state-of the-actual';
- connects 'big questions' at macro-level concerns of globalisation, the knowledge economy and late modernity in terms of the concerns faced by these particular learners at a micro-level; and
- senses why and how technologies are being used in the ways they are, in particular in immediate local contexts in Mozambique.

2.5 Going digital: Digital natives, the digital divide and inclusion

The rapid expansion of ICT gave rise to two important concepts: the 'digital natives' and the 'digital divide'. The latter is commonly defined as the gap between those who 'have' and 'do not have' access to computers and the internet (Van Dijk, 2006). Meanwhile the need for a more sophisticated understanding of the digital divide is widely understood. Such research is looking at geographical individual, social, cultural and economical issues (Czerniewicz and Brown, 2005) or pedagogical issues (Hardman, 2008). A recent study in sub-Saharan Africa has looked at investments in ICT infrastructure being followed by developments in human capacity (Fairchild and Quansah, 2007).

Van Dijk (2006) denounces a lack of qualitative as well as interdisciplinary research into the digital divide, complaining that it is difficult to capture the dynamic as "technology is changing fast and that the people who first adopted it do not stop to obtain new technologies and skills" (2006:232). He also mentions that "insufficient attention is paid to the consequences of the digital divide" (Van Dijk, 2006:232), which echoes Selwyn's (2009) call for research "to show greater interest in the

issues of democracy and social justice that surround educational technology" (2009:65). This has particular relevance for my study.

Bourdieu's (1986) concept of different types of capital can be employed for a more sophisticated understanding of the causes of different types of digital inequalities (Grant, 2007). In this context, Van Dijk (2006) puts forward a cumulative and recursive model of successive kinds of access to digital technologies, distinguishing among motivational, material, skills and usage access.

The controversially discussed issue of 'digital natives', as postulated by Prensky (2001) usually refers to young, technologically fluid and literate individuals who are surrounded by and using technology. Not doubting the existence of differences between generations, this study focuses more on the specific local and social context, in terms of access and use of ICT.

2.6 Technology identity

An innovative way of investigating the digital divide is the concept of technology identity. Interestingly, Goode (2010) mentions the importance of knowing how to use the technological ecosystem of university life as a critical success factor and refers in her paper to a blend of an individual's belief system "to explore how formative experiences and social context influence skills and attitudes towards computing" (2010:2). She also points out the interplay between home and school learning, which is relevant in my study too.

Investigating learners' agency in constraining conditions ultimately leads into the complexity of digital divide. Goode's (2010) construct of a 'technology identity' is helpful not only for methodological application during the design phase, but also to analyse data in terms of one's beliefs of own skills, the importance of technology, about participation opportunities and constraints, and motivation to learn more about technology. Although the study did not set out to obtain the life story narratives of interviewees, issues regarding their experiences with ICT as well as their personal attitudes and beliefs around technology were raised.

2.7 Learning and technology

This study does not seek to evaluate the computer course or the course instructors, but its aim is to locate the individual as the subject in an activity system and within specific learning experiences.

Moreover, studying learner agency in constraining conditions reveals "the choices they are prepared to make and the strategies which they find in order to engage" (Czerniewicz, Williams and Brown, 2009:86). Most related research papers around educational technologies in African countries address issues about formal basic education as well as tertiary education environments (Czerniewicz and Brown, 2005; Hardman, 2008; Keats and Schmidt, 2007; Ng'ambi, 2008; Rubagiza, *et al*, 2010). There is limited recent research work available that deals with other educational forms, like vocational training for ICT, and even less with a focus on sub-Saharan Africa's least developed countries (Madon, *et al*, 2009).

In the context of the research questions about the engagement in a structured learning process, cognitive concepts and relevant literature around distributed learning (Russel, 2002) and situated learning (Hedegaard, 1998) provide theoretical orientations. Meaningful and effectively engaging with ICT can be seen as a form of literacy – and thus of pedagogical relevance –, as "it is not just a set of functional, cognitive skills to be acquired, but a set of social practices by which cultural information is encoded and communicated" (Warschauer, 1999, in Grant, 2007:5).

Daniels' (2007) review on identity and social positioning in CHAT[9] makes an interesting contribution to learning in an activity system: he mentions the lack of a sophisticated account of discursive practice within activity theory and that "Engeström acknowledges the methodological difficulty of capturing evidence about community, rules and division of labour" (2007:95). This may be read as advice to consider notions of discourse when analysing agential stances on perceptions and expectations, and the motivating and discouraging aspects of an authentic learning environment.

2.8 ICT in the development context in Africa

> If you think education is expensive, try ignorance. (Robert Bok, Harvard University)[10]

This topic easily could expand into the biggest and most intensively discussed part of this work. However, building on the elaborations in Chapter 1 regarding the developmental aspects in the African context, the following lines serve to focus the readers' attention by citing from purposefully selected non-fiction literature, to provoke and open the mind when talking about a social world.

> In a half century of independence, Africa has not realised its potential. Instead, its greatest natural assets have undermined its prosperity. Africa's youth, far from being a huge source of talent and

[9] Cultural-Historical Activity Theory (CHAT).
[10] In Mills, G. (2010:63). Why Africa is poor.

> energy to be harnessed, are regarded as a destabilising force because they are largely unemployed and uneducated. (Mills, 2010:2)
>
> The purpose of development is to improve the quality of life of people. It demands finding the institutional and policy means to work together to raise productivity. And productivity comes from 'speed, innovation and excellence in innovation'. (Murphy, in Mills, 2010:23)

Friedman (2007) argues how increasingly affordable ICT is erasing obstacles to international competition, 'flattening the world' for adaptable and skilled individuals. In sub-Saharan Africa, the 'connectivity' of people increased tenfold over the last decade due to the spread of cell-phones, and this is regarded as the greatest single sustainable stimulus to the economy of every African country. In addition, Africa is linked digitally to the rest of the world via the gradual expansion of sea-cable connections. The lives of millions of people will be increasingly shaped by global and regional information and it is for me of interest if and how this can be linked to 'educational capital' and people's ability to transform and modernise themselves. Young people in Africa, growing up in a multimedia connected world see their world through a more global lens and social cohesion seems less visible along traditional notions of ethnicity but rather identities that reflect more benign aspects of age and class (Mills, 2010).

Balancing between the big picture and the reality on ground, selecting young people striving to be computer literate on their 'own choice and expense' is an opportunity to investigate into the agency of learners and their making of plans.

Part C – Summary of the conceptual base: Framing a theoretical approach

Globalisation and ICT bring the complexity of the 'social world' into our own 'home' and might cause uncertainty, change, and even threats. As a personal response, one may develop a more holistic understanding (*ganzheitliches Denken*). In this specific study field, however, a purely predictive theory is not the best the solution to address the research objectives. Kuuti (1994:52, in Russel, 2002:310) refers to activity theory as "a philosophical framework for studying different forms of human praxis as developmental processes, both individual and social levels interlinked at the same time".

2.9 Adapting a theoretical framework around a concentric model: Situating the activity system in a broader context

Understanding activity theory from that perspective, allows one to look at learning not just "as the internalisation of discrete information or skills by individuals, but rather as an expanding involvement over time – social as well as intellectual – with other people and the tools available in their culture" (Russel, 2002:310).

In addition, Cole (1996, in Russel, 2002:312) points out that activity theory assumes, that "individuals are active agents in their own development, but do not act in settings entirely of their own choosing"; he "draws also upon methodologies from the humanities as well as from the social and biological sciences". The latter suggests a consistency with an ecological systems approach that captures development as a joint function of person and environment, linking micro and macro dimensions. Cole's statement, as introduced at the beginning of this paragraph, is supportive to attempts to further look into agency, understood as embodied practices in reality and expressed as human reflexivity, or our power to deliberate internally upon what to do in situations that were not of our making (Archer, 2003).

Blending activity theory and critical realism to theorise the relationship between the individual and society, as Wheelahan (2007) argues by referring to Archer's morphogenetic realist social theory, highlights individual agency and workplace learning, thus broadening development of the individual, as well as addressing unequal power relationships that structure the socio-cultural context. In addition, Archer's (2003) perspectives on a *modus vivendi* and her trajectory of 'concerns > projects > practices' are helpful to understand the subjects under investigation within a broader context, to unfold at the micro level of the individual what eventually drives young learners in constraining conditions.

Lim (2002:411) proposes "a theoretical framework based on activity theory, with the activity system as a unit of analysis that is surrounded by different levels of ecological circles". A 'concentric' model has the advantage situating the activity system in a broader context, unpacking 'digital literacy' within its macro dimension as a world-wide phenomenon and linking it with learner agency in the context of constraints.

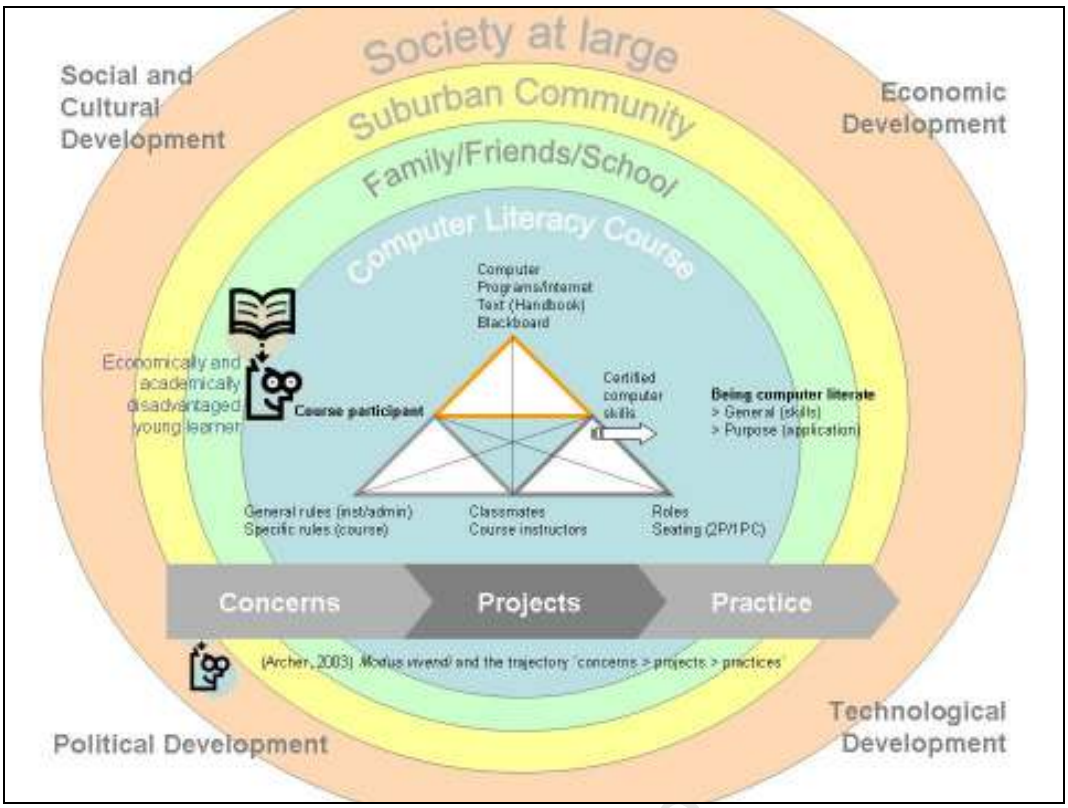


Fig. 8 – Schematic overview: Concentric model based on activity theory and supportive concepts

The result is a 'concentric' model (Figure 8) that places the activity system in a broader context, with each of the circles representing an activity system at a higher level (Lim, 2002), as well as incorporating related agential projects as a sequenced, individual process of 'concerns > projects > practices' (Archer, 2003). This theoretical approach also reflects the situated developmental context, as elaborated in Chapter 1 (Part B), to understand the subjects under investigation within a broader context.

Although activity systems at different levels may change over time, they are always interdependent of one another (Lim, 2002). In this understanding, the research questions and the concentric model are linked by interrelated themes throughout the methodological and analytical process, thus supplying the structure for the findings and discussion, examining at the micro level of the individual what eventually drives young learners in constraining conditions.

To summarise, adopting a 'critical' approach "does not entail a dogmatic adherence to any particular theoretical stance" (Selwyn, 2010:68), but it guides one to apply a critical social scientific approach that builds on appropriate theories and concepts, which allow technology to be viewed as socially constructed and negotiated. In this sense, the adopted frame is a tool "to develop social scientific accounts of the often compromised and constrained realities of technology use on the ground" (Selwyn, 2010:65).

Chapter 3

Research design and methodological choices

Chapter 3 describes the core processes around the fieldwork and data analysis as an integrative approach with the research questions and the theoretical framework in mind.

3.1 The aim of the study

Given the growing presence of ICT in our daily life, the motive of the study was to explore some of the ways in which this was affecting young people in negotiating and organising their lives. The objective of the study was to investigate learner agency to learn how individuals implement their needs, motives and plans in constraining conditions. In the particular context of this study, the research focused on the voluntary engagement of young learners striving to be computer literate and – in activity theory terms – to investigate how expansive learning and the object-outcome relationship are related to learner agency.

3.2 The research questions

Based on the identified research problem and aim of the study, the research questions were formulated as follows:

Why do economically and academically disadvantaged young learners choose to engage with ICT and what role do they see for computer literacy?

- What were the prior experiences of young computer course participants with ICT and why do they engage with such technologies?
- What are their individual perceptions and expectations regarding their engagement in a computer literacy course?
- What motivates them to participate in such a structured learning process to become computer literate, and what discourages them?
- How do they see newly acquired basic computer literacy helpful for their further engagement with ICT and for their individual plans?

3.3 Initial approach, research orientation and timing

As I was preparing the research proposal, I thought about the digitalisation of everyday life and the importance of the internet as a gateway for participation. This was prompted by the presence of mobile phones in my own suburban neighbourhood in an African city in a least developed country. I was surrounded by a vibrant community that is, due to its own cultural and socio-economic history, not a typical Western-style urban community. In many cases, people were continuing with their rural practices, even if these severely jeopardised normal urban functioning. Nonetheless, new forms of organisation to satisfy daily needs emerged too. The introduction and spread of mobile communications technology dramatically altered this picture (Madon, *et al*, 2009; Mills, 2010).

This research looks at two inter-related issues, namely the individual (in this case young people) engaged in a specific activity (a computer literacy course),being either enabled or constrained by their particular context (an economically disadvantaged area). Gaining a better understanding around the perceptions and expectations of a young person, as primary agent involuntarily placed in society, and the individual mediatory mechanism – or "power to deliberate internally upon what to do in situations that were not of our making" (Archer, 2003:8) – were initially dominant in my approach. Identifying activity theory, as a methodological frame to explore the individual within an activity system, made it more obvious that for my purpose, it was not in first place to investigate into 'human reflexivity' and "the practice through which we make up our minds by questioning ourselves, clarifying our beliefs, deliberating about concerns and defining our projects" (Archer, 2003:133), but rather linking the analytical strength of activity theory with its object-orientedness towards the outcomes of practice, with the subject as active agents, and their concerns informing their personal projects and actions, putting them into practice.

This puts more emphasis on the social transformation and human emancipation in terms of outcomes and context: the overall agential evaluation of costs and benefits, and the necessary personal capacity to reflect on ourselves and our concerns in relation to our social circumstances (Archer, 2003).

Regarding the second issue, an enabling or constraining context, embedding the methodological approach of activity theory in a 'concentric' model, with each of the circles representing an activity system at a higher level (Lim, 2002), helped to address the holistic demands of an analytical framework in a wider critical development context that envisages social justice.

In this context, with globalisation and ICT setting the pace and the direction that create both enabling and constraining influences for particular members and groups of society (Mills, 2010), it is our responsibility as individuals and members of society to make sure that we are not leaving out more and more people. It is necessary to give individuals the opportunities to acquire digital literacy and to benefit as an active member of society.

To conduct the study based on an exploratory approach that refers to the intention to understand the subjective world of human experience with efforts made to get inside the person and to understand from within (Cohen, *et al*, 2000), the timeframe (Table 1) was designed to accommodate sufficient time for each activity and to maintain an intensive exchange with the supervisors.

Table 1 – Chronological timeframe of the study

	Activities (03/2010 - 02/2011)	03	04	05	06	07	08	09	10	11	12	01	02
1	UCT research design seminar												
2	Preparation research proposal												
3	Research design												
4	Literature review												
5	Fieldwork (at 2 locations)												
6	Data transcription/analysis												
7	Drafting research paper												
8	Visits to UCT (supervisors)												
9	Supervisor feedback / review												

3.4 Research design and methods

Emphasis was placed on the relationships among the key components of the research. The interrelated key components featured in Maxwell's (2005) interactive model of research design are: goals, conceptual framework, research questions, methods and validity, with the research questions to function as a hub in the centre to focus on the interactive nature of design decisions.

The choice of an activity theoretical approach situated in a broader context, by nesting the activity system in concentric circles, while considering individual concerns and career plans over time, influenced the design of the field research. The research questions served to relate the goals to research relevant information and theoretical concepts, whereas the methods made it possible to answer the research questions, and to improve the validity of the study by using a selective triangulation strategy.

Whereas activity theory guided the analytical approach regarding relationships within the activity system as the unit of analysis, with a special interest in the outcome, content analysis provided some insight into agential stances, to unfold the personal capacity to reflect on oneself and one's concerns in relation to one's social circumstances. This agential evaluation in terms of costs and benefits, as part of the inner dialog and subsequent reflexive deliberations in the mediational process between structure and agency (Archer, 2003), was taken into consideration for the methodological choices and addressed in the various stages of data collection.

3.4.1 An exploratory approach by looking into cases

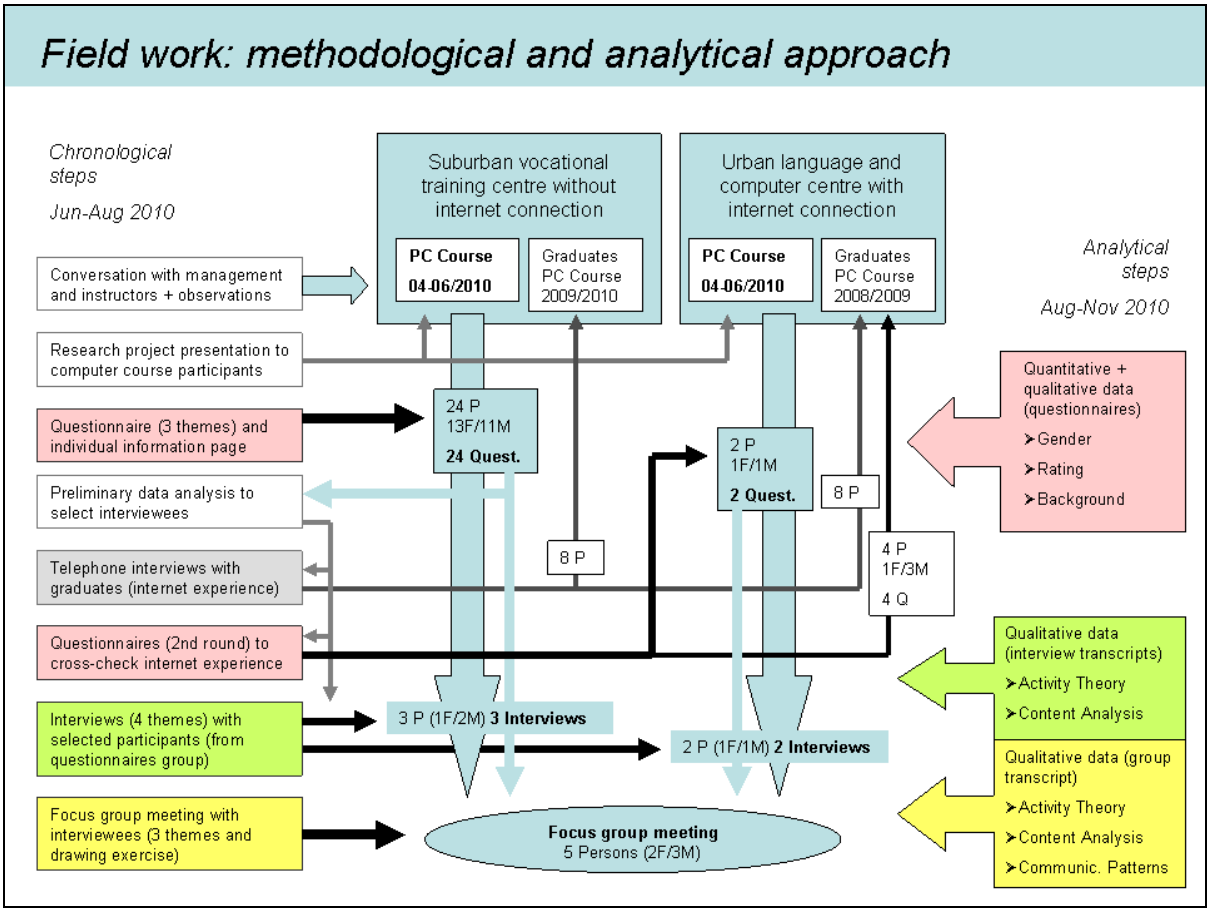
Cohen, *et al* (2000) define a case study as providing a unique example of real people in real situations with the intention to understand how ideas and abstract principles fit together. This approach was used in the fieldwork, looking at young people attending a computer course in two different locations. Robson (1993, in Boag-Munroe, 2007:140) suggests that a case study is valuable as a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence. Furthermore, "a case study allows the researcher to focus on individual actors or groups of actors and understand their perception" (Hitchcock and Hughes, 1995, in Boag-Munroe, 2007:140) – one of the main objectives of the study – and, as used by Boag-Munroe to locate the story of a certain aspect of social behaviour in a particular setting and the factors influencing the situation.

Lim (2004) refers to a 'collective' case study as a study of the particularities and complexities of cases obtained by extensive descriptions and analysis of those cases taken as a whole and in their context. In addition, Boag-Munroe (2007:141) refers to Miles and Huberman (1994), who state that a case looks at the object of study in a bounded context, while placing the individual as the acting subject of the activity in order to understand practice from the individual's perspective. This applies to the current study too, although emphasis was also placed on the context.

The study adopted a mixed-method approach that combines both qualitative and quantitative data. The minor quantitative part in Phase 1 (questionnaire) provided some baseline information. To investigate the real-life experiences of young learners attending a computer course, Phase 2 (individual interviews) and Phase 3 (focus group meeting) made up the dominant qualitative part.

3.4.2 Interrelated key components

The fieldwork consisted of three phases, which were structured carefully to assure that the questions used in the questionnaires, the individual interviews and the focus group meeting would provide the necessary data for the analysis. Themes included, for instance, the youngsters' experiences with ICT before and during the computer course, or their plans for future engagement with ICT, thus identifying interdependencies at different levels. This integrative process (Figure 8), which is described below, linked the research questions with the methodological and analytical approaches during data collection and data analysis.



Abbreviations: PC – Computer, P – Persons, F/M – Female/Male, Q /Quest – Questionnaires,
YA – Suburban computer centre (1st research location) , LCB – Urban computer centre (2nd location).

Fig. 9 – Schematic overview: Methodological and analytical approach

3.4.3 Sampling and setting

In classical educational research that uses a quantitative approach, researchers must obtain the minimum sample size that will accurately represent the population being targeted (Cohen, *et al*, 2000); in a qualitative study, however, a sample of five or six may suffice (Cohen, *et al*, 2000).

Purposive sampling was selected for this study. Participants were selected from a more or less homogenous group of disadvantaged young people attending a computer course; all came from similar socio-economic backgrounds. Patton (1990, in Maxwell, 2008:235) prefers purposeful sampling in qualitative research to probability sampling, convenience sampling, as "a strategy in which particular settings, persons, or events are deliberately selected for the important information they can provide that cannot be gotten as well from other choices". A combination of triangulation and a voluntary self-selection for the questionnaire phase was applied, aimed to soften the effects of bias and deliberate selection. Interestingly, the envisaged gender representation for Phase 1 was eventually achieved on its own, with a gender mix that corresponded to the real situation in Mozambique[11].

The study was undertaken primarily at a non-governmental vocational training centre in Beira, in the high-density suburb of Manga, because this provided the desired context in terms of target group, content and location (Table 2). Four times a year, the centre offers a basic computer literacy course, consisting of 8 modules adapted from a Microsoft training package. Each course takes two months and participants pay 750 Metical (equivalent to about 25 USD) for daily classes of 2 hours. During the research period, however, course participants at the training centre did not have internet connectivity.

Although this was a significant limitation for the course participants, it was also an opportunity to select additional participants with a similar background from a second private computer training centre in the city that had internet access. This increased the validity of the research by improving triangulation, which was an advantage when the two groups were joined in the focus group meeting to share their experiences.

Table 2 – Data box of the 2 selected computer course training centres

Training Centre	YA Vocational Training Centre	LCB Training Centre
Type	NGO	Private enterprise
Location	Manga (Beira high-density suburb)	Beira, city centre
Course fee (2010)	MT 750 (about 20 USD)	MT 1.250 (about 35 USD)
Computer laboratory	1 lab (25 desktop PCs); 1 internet café (not operational)	2 labs (total of 20 PCs)
Technical condition	2nd-hand donated computers; No internet connectivity	New computers; Internet connectivity with Teledata

[11] 51.3 % female population in Sofala Province, Mozambique. Source: Census 2007 [Online] Available: http://www.ine.gov.mz/censo2007.

Visualisation of study conditions at the two locations (Pictures taken with consent of instructors and course participants)		

Abbreviations: YA – Suburban computer centre (1st research location, LCB – Urban computer centre (2nd location), NGO – Non-Governmental Organisation, MT/USD – Currencies, PC – Computer.

During the preparations for the research, several meetings took place with management to present the objectives of the study, create interest and assure support. Meetings with the course instructors were scheduled to discuss the questionnaire and obtain their administrative support to organise voluntary participation of students. Meetings during regular course sessions also served as informal observations, giving some insight into the ways in which instructors handled the course, as well as becoming familiar with the course participants, meeting them, introducing the objectives of the study and asking for voluntary participation.

3.4.4 Participants in the study

The participants were all young people, who were attending computer courses at one of the two training centres, out of their own initiative. The vocational training centre in Manga was specifically targeting economically and academically disadvantaged young people. At the time of the field research, the centre was hosting four courses during the daytime, accommodating approximately 20 persons per course in its computer lab, which was equipped with 25 second-hand desktop computers. Though the targeted figure had been 20 persons (10 male, 10 female) for the first phase, 24 young learners, 13 of them female, voluntarily took part in the first questionnaire session of the first phase (Phase 1a).

3.4.5 Data collection: Mixed-method strategy and phases

The target group was chosen to draw attention to issues of socio-economic status, language and gender. As Portuguese is the official language of Mozambique, this was used for all written and verbal communication with participants and at institutional level. Although this was time-consuming, it gave the researcher control over the process and it provoked an intensive exchange and 'double reflection' on the data obtained.

Table 3 shows that the two-fold strategy of using different methods for the three phases, and maintaining a guiding structure of themes related to the research questions, was appreciated by the participants during data collection.

Table 3 – Overview of the applied mixed-method approach

Methodology	Small-scale, in-depth exploratory study		
Phases field study	Phase 1a (YA) Phase 1b (LCB)	Phase 2 (YA/LCB)	Phase 3 (YA+LCB)
Methods	Questionnaires; Observations; Telephone interviews	Individual interviews	Focus group meeting
Type	Closed and open-ended questions	Semi-structured interview; open-ended questions	Drawing of personal communication network; Semi-structured discussion
Form	3 themes 70 questions	4 themes 60 questions	3 themes 11 questions
Focus	ICT experience	ICT use, computer course	Computer course + plans
Period	Past > present time	Present time + future	Present time > future
Sample figures	13F + 11M quest. (P1a) 1F + 1M question. (P1b)	2F + 3M interviews	2F + 3M participating in focus group discussion
Data	Quantitative and qualitative data	Qualitative data	Qualitative data
Analysis	Activity theory analysis (object oriented, contradictions and collective learning) Content analysis (of meaning in context, using codes and categories for data reduction)		
Abreviations	*(YA) (LCB) – two course providers; F/M – female/male participants; (P1a/P1b) – Phase 1a/Phase 1b*		

The quantitative approach applied in Phase 1 was subsidiary to the qualitative methods, with the goal to provide quantified background data in which to contextualise small scale intensive studies (Brannen, 1992). With a defined socio-economic group (SEG) of economically and academically disadvantaged young people, clustering the scaled and numeric results was helpful to show interview partners in a community context, like comparing questionnaire feedback with official household data, or gender related occurrences.

3.4.5.1 Phase 1 – Questionnaire with computer literacy course participants

The key feature of Phase 1 was a questionnaire (Appendix 1a). As this is an intrusion into the life and privacy of the respondent (Cohen, *et al*, 2000), their informed consent was obtained through an informative letter handed over and explained beforehand.

One of the main objectives of the questionnaire was to gain a broader and better understanding of the context of the course participants. Turning the general purpose into concrete, researchable fields or subsidiary topics (Cohen, *et al*, 2000), the questions were grouped around three themes, addressing

- access to and use of ICT,

- perceptions and expectations with regard to attending a computer course, and
- the personal socio-demographic profile.

The structured questionnaire was adapted from a study into learner agency and ICT conducted in South Africa (Czerniewicz and Brown, 2005), and further expanded to facilitate the identification of data regarding issues on access and use, thus providing the opportunity for future research or the interested reader to gain a broader regional understanding. The questionnaire comprised 70 questions that included closed questions, multiple choice questions, rating scales and a few open-ended questions.

The data generated with these 24 questionnaires enabled identification of suitable candidates for the individual interviews and the focus group meeting. Given the participants' background and the fact that most of them had never filled out a questionnaire before, it was necessary to change the self-guided process to a more instructive procedure after 15 minutes; this involved reading each question out loud to the participants, and giving some guidance as to how to reply to each question, for instance, by ticking one of the own answers. The researcher's personal experience and flexibility were crucial to make the event a success.

The interpretation of the extracted Phase 1 data revealed that participants had limited experience of ICT and a significant information gap regarding the use of internet (see Appendix 1b). As access and use of internet in its multipurpose functions formed an integral part of the research objective, it was necessary to deal with this issue before advancing with the next phase.

After obtaining the contact details of course graduates with the help of the institution, a newly introduced 'Phase 1b' started by telephoning former computer course participants, who also confirmed a lack of practical experience with the internet. At this stage, it was decided to include a second group of young people, attending a similar computer course in Beira albeit at a place with internet access. After consultations and securing their interest and consent, six persons were identified to fill in the questionnaire: four of them had completed their course in 2008 (to compare with the feedback from the telephone investigation of Phase 1b), whereas the other two were in a similar situation as the participants in Phase 1a, as they were also attending a basic computer literacy course based on the same modules. Consequently, the latter two, one female and one male, were added to the group of 24 questionnaires and purposefully selected for the following two phases.

The questionnaire included a feedback section to allow the participants to express how they felt about the exercise and, as input for Phase 2 and Phase 3, a form of consent to indicate if they would

be available for an individual interview and a follow-up focus group discussion. Interestingly, 25 out of 26 signed the form and provided their contact details.

3.4.5.2 Phase 2 – Face-to-face interviews with selected course participants

The core element of the data collection process were the individual interviews, though purposefully combined with other methods (Cohen, *et al*, 2000). The standardised open-ended structure of the interviews enabled interviewees to indicate unique, alternative feelings about a particular matter (Cohen, *et al*, 2000). In view of their socio-economic background, standardisation was used to assure that all respondents understood the interview question in the same way (Oppenheim, 1992, in Cohen, *et al*, 2000) without jeopardising the exploratory intentions of the study.

Maxwell (2008:236) warns that "there is no way to convert research questions into useful methods decisions", as the selected "methods are the means to answering the research questions, not a logical transformation of the latter". Building on the information obtained during the data analysis of the questionnaire in Phase 1, the questions were grouped into four themes

- mobile phones,
- other ICT,
- the computer course, and
- the outcomes in terms of digital literacy and personal plans.

This assured that the 60 questions of the interview questionnaire (Appendix 2) were linked to the research questions.

Combining the feedback from Phase 1 and the research questions was in line with an integrative approach that suggests that the selection depends not only on the research questions, but on the actual research situation (Maxwell, 2008). Instead of opting for a pilot study, the use of phases ensured that the fieldwork produced the relevant data for answering the research questions.

Another objective of the data analysis of Phase 1 was to serve as a screening phase to identify the interviewees for Phase 2 and Phase 3 of the study. This ensured that the selected individuals satisfied the specific needs, by reviewing their responses regarding their socio-economic situation and engagement with ICT. Consequently, 3 female and 3 male participants of Phase 1 were invited to obtain qualitative data from a minimum envisaged sample number of at least 4 individuals. The two computer course participants from a second institution were included to secure additional

information relating to their practical experiences in the use of internet as well as creating an opportunity for comparison. All of them happily agreed to participate in the study.

The interviews were scheduled within two weeks after the questionnaire exercise, and held according to the preference of the interviewee before or after a computer class session in a separate, quiet room at the venue. A mobile computer was used to record the sessions, and to explain and show respondents additional practical applications, such as free software in combination with a 'laptop' computer. To get interviewees emotionally involved, a practical internet search demonstration on a mobile phone proved successful, using the search tool Google and 'their' vocational training centre as 'target'.

Cohen, *et al* (2000) highlight the fact that the interview is a social, interpersonal encounter, not merely a data collection exercise. My interactive attitude during the first phase had already created a sense of familiarity and common interest with the students. However, the ethical requirement to protect the interviewees was taken into account in the recording process as well as in the recorded data.

Although socio-cultural aspects had been considered during the preparations, it proved impossible to anticipate all situations, reinforcing the realisation that researchers must be flexible and open in 'intercultural encounters'. For instance, one of the female participants came to the interview in the company of her brother and in traditional Muslim clothing, because it was the holy month of *Ramadan*. As a married woman, she was not allowed to be alone with a stranger. Ethics, in terms of placing open questions regarding personal future plans, may create a dilemma for the researcher in such an unexpected situation, thus making it important that as researcher one is not only knowledgeable about the subject matter but is also an expert in interaction and communication (Kvale, 1996, in Cohen, *et al*, 2000).

3.4.5.3 Phase 3 – Focus group meeting and discussion with interviewees

The choice of a mixed methods design (Maxwell and Loomis, 2003) also proved popular with the participants in the study, as each phase made them curious and eager to take part in the following stage. The focus group meeting at the end of the data collection process was experienced by all as a highlight of the study.

In a focus group, the participants interact with each other rather than with the interviewer to allow new data to emerge (Cohen, *et al*, 2000). It also is a form of triangulation with more traditional forms

of observation, questionnaires and interviewing (Morgan, 1998, in Cohen, *et a*l, 2000), and was applied accordingly in this study. Cohen, *et al* (2000) explains that focus groups operate more successfully if they are composed of relative strangers rather than friends, whereas Bers (1994, in Lim and Chai, 2004) reports that if students are classmates or close friends, they may encourage more spontaneity. Grouping together course participants from the two institutions proved successful, particularly as they shared a common experience.

The focus group meeting was arranged for a week after the face-to-face interviews, which gave me enough time to finalise the structure and the strategy, by building upon the interview questionnaire and listening to the interviews. Following the two-fold strategy as outlined in the research design, the discussion (Appendix 8), lasting about one hour, and it was pre-structured around three themes:

- motives for engaging in a computer course;
- experiences during their participation in the computer course;
- computer literacy and young learners making plans for the future.

The focus group was conducted at the library of the vocational training centre in the suburbs of Beira. The two participants from the second location welcomed the opportunity to visit the place for the first time and to meet their 'colleagues'.

Of the 6 invited participants, 5 made it for the meeting, with one female interviewee from the local vocational centre not able to attend that day. This did not negatively affect the group. To maintain the homogeneity, the interview data of this interviewee from Phase 2 were not included in further analysis. A short introduction among the participants was followed by a productive group discussion that confirmed the method's strength of interaction, in that it supported the learners' point of view by allowing reflecting of how others interpret ideas and a debate of issues raised (Morgan, 1998, in Cohen, *et a*l, 2000). At the start of the discussion, a drawing task had been conducted as an 'ice-breaker' and to enrich the 'picture' of their particular social micro-world, visualising the individual communication relationships (Appendix 9).

In the following days, the interview recordings were simultaneously translated and transcribed into a text format, and transferred into a comprehensive data accounts sheet (using Excel format) for further analysis.

3.5 Validity and reliability

Triangulation can be defined as the use of two or more methods of data collection in the study of some aspect of human behaviour (Cohen, *et al*, 2000). The study incorporates the notions of triangulation in the following terms:

- theoretical triangulation to expand the activity theoretical approach (looking into the computer course and its outcomes regarding computer literacy), by drawing on supportive theoretical concepts in terms of context (ecological circles representing the context in levels) and processes over time (from individual concerns to projects and putting them into practice);
- combined methodological and levels of triangulation, by including a combination of observations, questionnaires, face-to-face interviews and focus group discussion;
- time triangulation, by involving participants in the various methods over a short period of time (without the dimension of a longitudinal approach, but looking at the same issue on three separate occasions over two weeks); and
- spatial triangulation, by including a second location with identified differences in the practical experiences.

3.6 Data analysis

The input from respondents of the three phases served to

- understand the context of the study itself better, with the selected locations and the individuals engaged in a computer course under investigation,
- select purposefully the candidates for the face-to-face interviews and follow-up focus group discussion, and to
- provide background information to get a better picture of the cases, or profiles, or notions of narrative descriptions.

This ongoing analysis within each method, between methods, and among the cases themselves alongside the data collection and data processing (Lim and Chai, 2004) helped to undo biases and to 'fine-tune' the research methods. The literature on data analysis in qualitative research, with a special interest in analysing interviews suggested the use of some form of coding for interpretation. Cohen, *et al* (2000) warns in this context about the risk to loose the synergy of the whole if struggling within the tension between maintaining a sense of the holism of the interview and the tendency for analysis to fragment the data.

Certainly, establishing a conceptual relation between the research design and the design of the data analysis reduces this risk, in the same way as a simultaneous process of data collection and data analysis (Fig. 10), as practiced in the study, made it easier to maintain the focus.

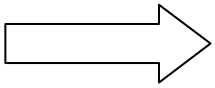
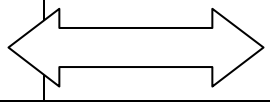
Activity system	Questions and problems using AT analysis to answer research questions	Reference with qualitative data (units of analysis)	Coding and categorising of qualitative data	Theoretical and analytical concepts and themes
Subject, object, tools, community, rules, division of labour				Vygotsky, Bourdieu, Archer, Goode, etc.

Fig. 10 – Analytical approach for data analysis using AT

With regard to coding being the main categorising strategy, Maxwell (2008) argues that that fracturing and categorising can lead to the neglect of contextual relationships among the data and proposes the importance of distinguishing between organisational, substantive, and theoretical categories. Whereas the generally dominant organisational categories are used to capture the broad issues for further analysis, substantive categories can be used to describe participants' concepts and beliefs. "They can be used in developing a more general theory of what's going on, but they don't depend on this theory. Theoretical categories, in contrast, place the coded data into a more general or abstract framework." (Maxwell, 2008:238)

Using substantive categories was helpful later, by including participants' ideas as part of their 'story' that had not been captured in broad groups or in the theory. It also helped to compensate for not selecting an ethnographic approach. Connecting strategies were used to visualise more accurately the context for the individual cases and notions of 'narrative stories'. Maxwell (2008:239) states that "both categorizing and connecting strategies are legitimate and valuable tools in qualitative analysis" and draws attention to the fact that analysis strategies need to be compatible with the questions asked.

Moreover, the process of translating and transcribing the obtained data provided an opportunity to decide upon the unit size for further processing, following the flow of the conversation and the filtering process, informed by the theoretical framework. The unit sizes were either phrases or statements in the form of sentences used in the content analysis of the open-ended data.

Besides adding to each unit a loose coding, informed by relevant theoretical elements of the framework, a second step highlighted units that reflected some kind of substantive 'powerful' statements to inform my research. Russel (2002) refers in this context to activity theory analysis to

formulate questions and problems from the perspective and relationships of its nodes, looking at the respondents' data for enabling and constraining conditions and contradictions in the activity system (Table 4) (Appendix 10).

Table 4: Examples of the analytical approach using AT

Activity system (Nodes)	Questions and problems using AT analysis to answer research questions	Reference with qualitative data (Units of analysis)	Theoretical and analytical concepts and themes
Subject	Learners participate in several AS (Course, school, work, etc.): Where do they come from? Are different entry levels create tensions for learners?	Cutural and socio-economic background; previous experiences and involvement (Technically, socio-culturally); 2 persons with different levels sharing a computer in class	Bourdieu (Capital and habitus); Archer (Agency and personal identity); Goode (Technology identity)
Subject, division of labour	Does joint activity (Expansive learning) become visible in collaborative action?	Prompted experiences of negotiating new ways of acting together (2 persons sharing a computer in practice)	Vygotsky (Expansive learning through collaboration); Lave (CoP)

The same procedure was employed for the focus group discussion in merging the results from Phase 2 and Phase 3 by means of the coding and categorising process, grouping and regrouping units around emerging issues and themes. Experimenting with the methodological distinction of categories helped me to think about and handle the crucial process between coding and categorising without loosing the link between the theoretical frame, the research questions and the subjects of the study, all the while keeping the research problem in mind. This is also in line with the multiple meaning, readings and interpretations of content analysis that views meanings in texts as personal and located in specific contexts and purposes.

Summarising Chapter 3, the integrative approach provided a conceptual frame that related the research questions, the theoretical framework, and the methodological and analytical approach within the context of the research objective. This integrative approach was also well supported by triangulation. The fieldwork in the three phases was structured around themes that were linked to the research questions, thus leading to responses that provided detailed accounts of learner agency in constraining conditions in an authentic setting. With the activity system as a unit of analysis to identify contradictions and change, the concentric model represented the broader context in successive circles, making it possible to analyse and describe interdependencies at different levels, as expressed in the trajectory of 'findings > discussion > conclusions'.

Chapter 4
Findings and discussion

Guided by the theoretical and methodological framework, the two-part structure of this chapter, viz. the findings (Part A) and their discussion (Part B), follows the two-fold strategy that was applied in the mixed-method design during the fieldwork, breaking down each phase according to the themes linked to the research questions (Appendix 2). The concentric model describes and relates the responses within and between the successive circles, representing the activity systems in the broader contexts of disadvantaged young people striving to be computer literate. To include authentic agential stances in the findings and their respective discussion does not only support the process and purpose of the research, but also gives readers more liberty to make up their own mind.

Part A – Findings

The findings based on the questionnaire responses of 26 participants of Phase 1 (Appendix 1b) are presented in a gender-related form that looks primarily into frequencies and ratings, to provide insight into the particular local social-cultural and socio-economic context of this study. The five individuals who participated in Phase 2 and Phase 3 are the core information providers, and those findings are presented in a form that best mirrors the authentic circumstances of these individuals and their contributions and responses to the questions.

4.1 Setting, sampling and participants

As outlined in the mission statement, the non-governmental vocational training centre establishes selective criteria (age, course related minimum experience or school grade, payment of tuition fees) for their programmes; these criteria both require and meet official approval to operate as a vocational training centre for economically and academically disadvantaged young people. The centre is located in a high-density suburb with high poverty indices. The sampling of 24 participants from the centre, mixed with two participants from a private business training centre in the city centre, did not cause any significant changes to the results of the quantitative analysis of the questionnaire feedback. To verify participants' individual status as 'disadvantaged', some questions were asked to identify their socio-economic group (SEG), which is discussed in Part B of this chapter with regard to local household census data.

4.2 The questionnaire: Main findings of Phase 1

To understand more about the strategies of young people to develop ICT skills and knowledge, the questionnaire focused on issues that relate to the issue of the 'digital divide': access to and use of ICT, beliefs, attitudes and experiences around ICT and the computer course, as well as information around the SEG, gender and age. An overview of the baseline data analysis by gender and frequencies is presented in Appendix 1b (in Excel format).

Although the selection of study participants followed a voluntary process that was facilitated by the course instructors, the envisaged number of 20 participants was exceeded. 24 course participants from the suburban vocational training centre took part; they were later joined by the two participants from the training centre in the city. They consisted of 14 female and 12 male participants, with an average age of 21 years. This gender figure corresponds with local census data[12] of 51.3 percent female population in the Province of Sofala.

4.2.1 A situated socio-economic and socio-cultural context

The SEG data reveal that only 4 out of 26 computer course participants out are employed. 2 male and one female have a part-time job and only one young woman has fulltime work, whereas 8 females and 5 males are jobseekers. Although the average age of the study participants is 21 years, 9 young women and 5 men still attend school at a secondary level. Consequently, it is not surprising that the average monthly expenses of the participants do not differ significantly, with females spending an equivalent of 28 USD a month, and males 30 USD. All 14 young men own a mobile phone and spend on average one third of their overall monthly expenses on 'being connected', whereas the females spend about a quarter, or an equivalent of 7 USD per month on telecommunication, with four of them not possessing a mobile phone at all.

Table 5 – Household survey 2007; Beira household (HH) data (Headed by male or female)[13]

Households (HH)	HH in Beira	Television	Fixed Telephone	Computer	Car	Last 12 months:	Persons
Total HH	94.804	33.066	3.079	3.493	5.516	Used a PC	24.628
Male HH	73.689	26.620	2.416	2.913	4.727	Used internet	13.950
Female HH	21.115	6.446	663	580	789	Owns a mobile phone	108.186

[12] Official Household Survey 2007, GoM. [Online] Available: http://www.ine.gov.mz/censo 2007/rdcenso09/Sofala.
[13] Official Household Survey 2007, GoM. [Online] Available: http://www.ine.gov.mz/censo 2007/rdcenso09/Sofala.

Comparing official household data regarding access to tap water, electricity and a telephone line, as well as the possession of a TV and a computer (Table 5), 6 households out of the 26 respondents do not have tap water inside their house, 2 do not have electricity, and only one household has a fixed telephone line. Only 4 households do not possess a TV, while only one household has with a computer. Data suggest that the household wealth of some of the male participants is lower. Whereas 6 young women already have their own family and household, none of the young men of the same age do. Regarding the use of language, Portuguese (as the official national language) is used among family members in 15 out of 26 households with no gender-specific frequencies.

4.2.2 Experiences with ICT

In order to explore the first research question, "What are the prior experiences of young computer course participants with ICT and why do they engage with them?", questions focused on the access to and use of mobile phones, computers and the internet. Generally, it was found (Appendix 1b) with regard to their beliefs, skills and experiences that male participants rated themselves on average one level higher or slightly more convinced, enthusiastic or experienced than their female counterparts. This might be supported by the fact that 11 out of 14 female respondents had only had their first learning experience with a computer at the training centre, compared to 6 out of 11 young male learners.

With regard to the internet, most respondents seem to relate it personally with the use of a computer. The majority of female respondents had never used internet related applications, whereas only one young male learner used the term never in this regard. Looking at various applications, male respondents sometimes used internet search and a few had used some kind of social networking. Hardly anybody had communicated via e-mail and none of the interview partners had had their own e-mail account before the computer course.

Moreover, the vast majority of respondents confirm that they have access to radio and TV, and that their experiences and use of ICT revolve primarily around mobile phones, which are primarily employed for social use. Only 6 female and 9 male respondents use text messaging 'often' or on a regular basis. Only two young men out of 26 study participants know how to connect to the internet via their mobile phone. However, they do know that mobile phones are ubiquitous tools and more than half are using a variety of applications, which is probably limited by the functionalities/uses of their mostly basic mobile phones.

4.3 The individual interviews: Main findings of Phase 2

When investigating a topic such as this, viz. young people striving to be computer literate, it is important to look beyond mere learning and to consider the potential use "as having relevance to their lives" (Stanley, 2003:410), or as technology for social inclusion (Warschauer, 2003). The individual interviews (Appendices 3 to 7) revealed how digital technologies are actually being used within often compromised and constrained social realities (Goode, 2010). The interviewees were purposefully selected: three computer course participants from the vocational training centre for economically and academically disadvantaged young people in a high-density suburb of Beira, and two participants from the language and computer training centre in the city centre (Table 6). Two different training institutions were used to identify potential differences linked to the social milieu or SEG of the participants, as well as differences in their practical experiences of the internet during the respective computer literacy courses.

Table 6 – The five interviewees (Part 1): A short introduction

Interviewees	**YA - Vocational training centre for economically and academically disadvantaged young people**
Luisa (fem.), 21 years; married, 1 child	Luisa did not finish secondary school (grade 11) and had never used a computer before this course. She now owns a simple mobile phone, but 2 of the previous phones had been stolen and one broke. She is looking for a job for one year and intends to do a secretarial course. In order to do this course and to reach her career goals, she needs to obtain a computer literacy certificate.
Antonio (male), 20 years	Antonio is in grade 12 and was introduced to computers a year ago at a youth centre. He received financial support from a cleric to attend the current course. His first two mobile phones broke and he owns now a 2nd hand phone with internet access. He uses the computer to copy music, without knowing much about intellectual property rights.
Manuel (male), 20 years	Manuel did not finish secondary school (grade 11) and attended computer lessons at a teachers' training centre. The course enabled him to work as a part-time English teacher. He is keenly interested in ICT and remembers each of his 5 mobile phones by brand and model. Of his previous phones, 2 had been stolen and 2 were damaged.
Interviewees	**LCB - Language and computer training centre**
Maria (female), 26 years; married	Maria did not finish secondary school (grade 10). Her brother owns a computer with an internet connection, but she has never asked to use it. The course is her first experience of ICT. She has her 4th mobile phone and upgraded because she always looked forward to the next one. She wants to know about the internet, but she did not activate the facility on her phone. Having looked for a job for a year, she realised that computer skills were a prerequisite.
Mateus (male), 23 years	Mateus concluded grade 12 and is looking for 2 years for his first job. Though he had several mobile phones and activated internet for social networking, this course is the first experience to learn about computers. He already uses his new skills to improve his application documents and to send his CV to companies via internet.

All five interviewees also formed the focus group in Phase 3. The individual exercise at the beginning of that meeting, to draw their personal communication network (Appendix 9), was incorporated at this stage to enrich the 'picture' of their particular social micro-world.

4.3.1 Mobile communication and social relationships

The mobile phone is not only appreciated by all respondents, but it also is part of their lifestyle, with some respondents having detailed brand knowledge and already knowing which model they wanted to own next. All of them had been offered their first mobile phone by family members, and the purchase value of their latest model ranged between the equivalents of 30 to 45 USD. Two important facts were presented in connection with value and quality by the three interviewees, who were all living in the suburbs of Beira: they had lost all their previous phones either because they had been stolen or damaged. In contrast, the two respondents from the city centre mentioned upgrading as the motive for changing their phones.

Given their limited financial means, all used among technical skills, an abbreviated language for text messaging, and the basic phone functionalities to stay in touch with their personal communication network. A kind of 'zero credit' communication worked to their satisfaction when combined with specifically targeted service options by telecommunication operators. In neither the interviews nor the focus group discussion did they complain that 'owning' a mobile phone, or mobile communication in general, was expensive, or that they could not afford to sustain it. This suggests that the mobile phone has become a fully integrated part of their lifestyle and cost/benefit considerations are automatic within their normal daily routine. Whereas they discovered the functionalities of their phones mostly by 'trial and error', they learnt about promotional products mainly from friends and advertisement campaigns, present in all media channels, including text messaging.

To respond in more detail to the first research question, the individual interviews provided not only a chance to follow up on individual usage patterns, but also to ask about their motives for using such phones and their influence on social relationships. Only two of the 5 participants had thus far accessed the internet via their mobile phone, and both had done so to link up to a social network service called 'mig'. Nonetheless, all 5 interviewees expressed a great interest in the internet as one of the main reasons for their curiosity to attend a computer course. However, although they all recognised the potential for instant access to information and search functions, they had almost no practical experience of 'surfing the net' and very limited theoretical knowledge and skills.

> What sometimes complicates is, when you have some issues … (pause) how to select … for example, when you enter a website ... it downloads some information ... and to come from one information to another, that turns sometimes difficult ... so you download ... and wait ... just do discover that you got something different you were looking for ... that happens... (Antonio – Appendix 5, lines 87-89)

All of the participants felt that mobile telecommunication and change in their social relationships had been positive, in that it had bridged the distance between dispersed family members and resulted in time-savings. It had also changed how they dealt with urgent matters, and using text messaging in a twitter-like style meant that they did not need to be physically mobile in order to know where others were or what they were doing. Only one contrary argument was mentioned, namely, that such digital communication could also lead to greater separation.

When they were questioned about the 'tactical' use of mobile communication, two interesting views were expressed by the two female participants in relation to the Short Message Service (SMS or text messaging):

> Like sometimes you do not have the courage to face a person directly ... so you might have the courage to send a SMS. (Maria – Appendix 3, line 75)

> I am using SMS sometimes ... for things that are more difficult to talk ... to talk, it might take me some time, but with SMS I just can send it. (Luisa – Appendix 4, line 43)

The three young men rejected a tactical use of text-messaging to deal with difficult situations and to achieve their own goals:

> If I have an important issue, it is better face-to-face, because there are persons who lie when you call them ... you talk around like this and that … no, it is better face-to-face. Hmm.... like that is to run away from persons ... that is not correct ... no, I don't use that ... no, problems don't disappear and you don't run away from problems. (Mateus – Appendix 7, lines 66-69)

> No ... I am using SMS for cases I said ... when I have no credit left or so ... I don't use SMS in that way ... I am talking straight about things, straight. (Manuel – Appendix 6, line 63)

> Well, with parents that is somehow difficult … they need that face-to-face contact. No ... I prefer to face them, and tell them what I want. (Antonio – Appendix 5, lines 54-57)

4.3.2 Gender-related views on the use of mobile communication

In response to the question on whether women used ICT differently to men, one clear first response was "I don't think so" and another was "for me, till now, I do not see any difference". However, when they thought about the question more deeply, two male respondents commented that "there are also women who have more skills than men", while the other could "see a difference that more men are using it":

> Women, some use it … others still do not know about that this is important ... they do not know yet … but this should be lack of information about it. (Antonio – Appendix 5, line 77)

Later, during the focus group meeting, the issue of being placed next to a girl to share a computer came up. Initially, this seemed to me to raise some gender-related resentment; however – and to my positive acknowledgment – the group discussion took a sensitive turn to separate the arguments correctly, identifying the real cause and nature of the individually felt disruptions (see Appendix 8, lines 106-143).

4.4 The computer course: Five individual insights into learner agency

In the study's theoretical framework, the concentric model situates the activity system in a broader context of the computer course, which in return represents the basic unit of analysis. Whereas the concentric circles cover the socio-cultural context and developmental dimensions of a holistic approach, learner agency is considered against personal concerns and plans in constraining conditions. The computer course needs to be understood as "a functional system of social and cultural interactions that constitutes behaviour and produces that kind of change called learning" (Russel, 2002:317), with individuals learning with tools, and people who help them to carry out their goal-oriented activities in a socio-cultural setting (Lim, 2002).

Consequently, the second specific research question, "What are the individual perceptions and expectations of young disadvantaged learners regarding their engagement in a computer literacy course?", and the third specific research question, "What motivates them to engage, and what discourages them from engaging, in the structured learning process to become computer literate?", explores their into reflective deliberations and active practices related to the computer course.

Although the respondents were attending comparable basic computer literacy courses, they came from two different course providers. The three interviewees who took the course at the vocational training centre some 15 km from the city centre were also living in remote suburbs, and it took them up to 30 minutes to reach the centre for their daily lessons, which last two months. The other two were located within 10 minutes walking distance to the course provider, located centrally in the downtown area. Both places had been selected by them based on recommendations of friends or family members, who had attended the same course.

Regarding their personal motives to become involved with computers, two replies were linked to peer groups, namely, "my motivation is to dominate all what they also know" and "because my friends already did computers, so I felt a bit lost". The others clearly explained that their motives

were to "find a job", and in the one case of a part-timer, to use it also for his English teaching tasks. When additional questions were asked about the selection criteria of participating in such a 'structured learning process', some light was shed on their reflective deliberations:

> The advantage for me ... here ... I get accreditation for my knowledge. I can take some value out of that what I know. (Luisa – Appendix 4, line 123)

Three respondents emphasised the importance of obtaining a certificate, in the hope that this would make it easier for them to find work. Other expectations about the advantages of a structured course programme included: having instructors, learning in an organised step-by step way together with participants at the same level, and being able to use a computer at work or at school, or, as one of the respondents put it, "dominating computer programmes in a more serious way".

> An advantage is ... look ... if there would not exist this form of learning with an agreement ... the advantage is ... if there is a limited time table, the people are more interested. They do their hours and go straight home ... and at home they do not have access, so they try to benefit from the time available to learn about.
> (Antonio – Appendix 5, lines 140-141)

Activity theory examines the intimate mechanisms within the unit of analysis (Lim, 2002) by asking questions regarding behaviour, communication and learning, to identify contradictions and change in the form of expansive learning (Fig. 11). The course participants represented the subject in the activity system as individuals, who were themselves participating in other activity systems as well as bring a different history of diverse involvements to a particular activity system (Russel, 2002).

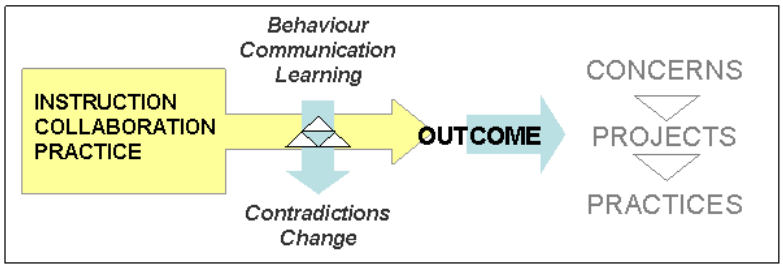


Fig. 11 – Analytical scaffold to look into learner agency (Activity system as unit of analysis)

Two issues that were addressed by questions in the interviews, and that came up again during a heated debate during the focus group discussion – around the instructors and collaboration during the course – are important to get a feeling of how the course was experienced on the ground as well as to visualise notions of expansive learning.

The individual interviews portrayed the instructors as central figures, not only with regard to the participants' reflective deliberations to decide in favour of a 'structured learning process', but also during the course, as expressed in positive experiences and appreciation.

> I think it is also to be thankful to the instructor. He did a lot of work ... serious work. So if I know now something, then this is due to his contribution. (Antonio – Appendix 5, lines 152-153)

In this context, respondents referred to positive experiences as helpful, in that they were able to cross-check, based on provided feedback, to go back if something was not understood and repeat it, and also to get corrected and to be "put on track what I really want to know". However, it also became obvious that the instructors had different roles in the course (as an activity system), and that some individuals experienced contradictions.

> Well, during the first days ... some of the functions seemed to be complicated for me ... to do one thing, not knowing to do it in another way too ... sometimes calling the instructor to get a response to try it out by myself ... (laughing). (Mateus – Appendix 7, line 177)

The relationships and interactions within an activity system regarding instruction and expansive learning became visible. When asked to compare their experiences on the course with their experiences at school, especially with regard to their link to books and teachers, there was mixed feedback. Although they gave opposite views, all identified practice as the most important distinction: the experience of practice as a way of instruction, matching with their own preferences to practice and linking explanation and practicing led to some 'curiosity', for instance, when the instructor announced a new package for the next day. The conversations did not stop at the level of experiences and preferences of pedagogical methodologies, but also touched on perceptions of the different institutions:

> Researcher: If you compare your learning experience with that of your time at school, is there any difference?
> Interviewee: Well, there is a difference. There it is more general teaching, whereas here it is a training centre. Here they insist you to know, but at school ... it depends only on you to know. Here if you do not know something, you have to repeat till you know ... at school not.
> Researcher: But at school, if you don't know, you have to repeat the class.
> Interviewee: No, you repeat the class, but ... for example, if you don't know and ask the teacher that you didn't get it well, he will say 'do it, do it, study more' but he will take it not serious ... so it is only up to you.
> (Antonio – Appendix 5, lines 160-165)

Conditions may have a decisive impact, especially when trying to capture and understand the real life situation of members of a society who come from a low SEG. Participants expressed great joy at having a computer at the training centre "only for me, where I save my documents", and arriving the next day, when "I only open my documents". However, conditions created also moments of frustration, for instance, when there were technical breakdowns, or when participants were re-seated, or when more than one person had to work at a single computer.

The biggest frustration related to the absence of an internet connection at the vocational training centre. The two different experiences expressed during the interviews speak for themselves:

> Yes, there is a thing ... what is difficult for me till today ... it is about the internet, due to the lack of practice. For that reason, it is difficult for me how… (Manuel – Appendix 6, lines 166-167)

> I liked most when I entered the internet. This I really liked most. Because I only heard from others and did not know how to enter internet ... I liked that. (Maria – Appendix 3, lines 235-236)

This fact became even more obvious during the focus group discussion that was joined by all five interviewees, thus showing its methodological usefulness to triangulate with more traditional forms of interviewing, questionnaire and observation (Cohen, *et al*, 2007).

4.5 The focus group discussion: Findings of Phase 3

It was motivating and rewarding to observe the interest of the interview partners to meet each other and share experiences, finding themselves as part of a group with common experiences and some form of technological identity. From the beginning, there was a fresh spirit that created a spontaneous dynamic that lasted during the discussion of more than one hour. Participants interacted with each other rather than with the interviewer, thus allowing new data to emerge (Cohen, *et al*, 2007), as the group deeper into their discussion, which began by asking about the motivation for their 'engagement' in a course in first place, before moving on to ask about their experiences of a collaborative learning process in an activity system.

In their discussion, when asked why they had begun the computer course, which led to the second specific research question, they raised issues such as being connected, staying informed what is happening, and to communicate both with friends nearby and with new friends further away. Interestingly – in contrast to the individual interview sessions – the importance of being computer literate in order to secure a job only arose at the end of their conversation.

> As it is said in the 21st century, who does not know a computer, does not know information technology ... is considered an analphabetic ... and I did not want to be put into that group, … and beside that ... now everything is modern … it seems normal to leave a meeting without pen and paper, but with a computer that all that recorded, saved in folders… (Maria – Appendix 8, lines 34 and 60)

They expressed a keen interest in gaining more knowledge and skills, as well as noting that schools have difficulties coping with those new demands. They claimed a lack of access to computers in basic education, which limits the introduction of school pupils into new technologies to theory without practice, with one respondent stating "computers you find only in training centres". However, at secondary level some felt that teachers expect you to know and push through the

curriculum. Teachers give tasks that demand one to go to libraries just to find no relevant books, so "you need others to do it for you", searching the internet, typing and to print, all of which were regarded by the group as time consuming and costly exercises. They were convinced that knowledge and skills about computer were necessary and helpful in modern society.

4.6 The computer course: Group discussion about engagement in a collaborative activity

The third generation activity theory, as elaborated by Engeström (1987), is premised on the notion of learning as expansive and thus providing a useful heuristic for analysing activity as a collective endeavour (Hardman, 2008). In searching for detailed experiences regarding the third specific research question – what motivates and discourages participation in a structured learning process – this section presents the additional findings of the group discussion with regard to the individual learning experiences in an instructional setting with more competent instructors and less competent novices. Based on elaborated analytical questions focusing on the activity system as the unit of analysis (Appendix 10), the analytical scaffold/framework also enabled the group discussion to explore agential stances on notions of behaviour, communication and learning, regarding situations of contradictions and change.

4.6.1 Two persons on one computer and conflicting roles

An intensive discussion sparked around the issue of two persons working on one computer, which ranged from frustration to enjoyment, notions of gender-related differences to differences at knowledge levels, as well as comments of offence to guidance experienced in specific situations and activated by actions of the instructors. One of the participants of the focus group meeting summarised it simply: "For me it was good" (Appendix 8). The approach selected in this research of asking analytical questions to locate and examine contradictions and disruptions was helpful in formulating findings, and served as a checklist for the discussion in Part B, by referring to involved nodes and their relationships to support explanations.

Working together on one computer stimulated expansive learning, as long as participants assisted each other and shared ideas. It seemed important that this was part of the instructional process, as expansive learning first happened at an interpersonal level, followed by internalisation at an intrapersonal or cognitive level.

> A problem for me was to sit 2 persons at 1 computer on the first days ... I didn't like that, but they insisted … only later I realised that it is better. (Mateus – Appendix 8, lines 121-122)

In contrast, however, if the instructor had to switch roles and take on administrative functions to place two learners at one computer, such as moving students due to a breakdown or an insufficient number of operational computers, learners became passive and frustrated. In the vocational training centre – with far bigger groups and computers that were second-hand donations – the challenge to 'handle' unforeseen situations, and thus feeling negatively affected, were therefore experienced by all three interviewees occasionally.

Although one respondent mentioned during the individual interview the fact that all course participants have the same level and progress happens step-by-step as an advantage of the structured learning experience, this was examined further in the group discussion. Thinking about the context related to low SEG and analysing their discussions suggested that different entry levels were creating tensions for learners.

> Here ... it was like that. 2 persons on 1 computer is not wrong. What happens is that our instructor, putting together 2 women, with one understanding less ... the instructor says 'give the mouse to the other' ... one that doesn't understand anything, who is not getting it well. So we try to discuss something ... to be practical ... but I have only 5 or 10 minutes to learn. Then I am thinking that I have to leave home, pay transport ... and at the end of the day I learned nothing. (Luisa – Appendix 8, lines 135-140)

Nevertheless, all five agreed in their assessment of their respective instructors as good and key to their own learning progress. Whereas the two participants from the city centre appreciated the individualised supervision and encouragement to find own solutions from their instructors, the others also praised the right mix of theory and practice, as well as guidance to be more competent and feel more confident. Taking my own observations at the two locations into account gave no reason to doubt that they really liked their instructors.

4.6.2 Training is practice, based on instruction

Practice is an integrated element of the pedagogical methodology of the basic computer literacy course offered at both institutions. All interviewees were very much aware of the significance of practice to become literate, not only in the sense of acquiring knowledge and skills, but also to gain the self-confidence to participate actively in a changing world.

> Because if you practice, more things come up ... and from this, you need to investigate more things ... and from there you succeed good things. (Manuel – Appendix 6, line 174)

Nevertheless, practice depends on access. This is even more relevant in a low SEG context with generally limited access and higher opportunity or transactional costs as a reminder of 'digital divide' in its classical definition: access to a computer and the internet. As explained by the management,

the vocational training centre could not provide internet access for a prolonged time and was still working on a solution during the period of the field study.

> And the last thing I did not like ... was the internet … we did not have access to the internet. We had no practice on the internet. That was something that left me somewhat ... sad. (Manuel – Appendix 8, lines 115-116)

> But you need to have access to a computer to have more practice. It is already different if you have at home no access to a computer. If you have only this training and continue without practicing ... that's already difficult ... in 2 years you can forget it. (Maria – Appendix 8, line 182)

The issue of continued practice based on 'access and use' was not answered by the respondents in a way to present a finding as 'key' for their problem. Although four interviewees mentioned that the next ICT device on their personal 'wish list' was a computer, it did not seem realistic when comparing available data. Information on their monthly spending, their purchasing power based on the value of their mobile phones, and their SEG, including the security risks and social power relationships, all represented constraints that would most likely sustain the gap between desire and real-life realities.

4.6.3 Computer literacy as outcome of the activity system

Mozambique is a country where literacy rates represent integrated evaluation criteria in poverty reduction programmes (PARPA, 2006), and the established entry criteria for this particular computer course is that participants can 'read & write'. Computer literacy, independent from skills level or experience, has only emerged in the vocabulary of the national educational context in the last decade. 'Digital literacy' as a term itself was not yet present in the mind of the interviewees, nor did their basic computer courses address some of the essential 'new skills' (Warschauer, 2002; Siemens and Tittenberger, 2009) aligned to this term.

However, the last research question was intended to investigate computer literacy, or digital literacies, looking beyond learning (Selwyn, 2010) in 'real-life' contexts. Primarily, the interviewed course participants were introduced to computers as 'workstation' and to its basic classical applications, and gained familiarity with these through practice. This was understood by all, and appreciated. They linked their new basic knowledge and skills purposefully with work and school, as well as indicating they were motivated to continue learning and to do other courses, with their own projects in mind.

Regarding the practical use of the internet, they made up their theoretical understanding to investigate, stay informed, be connected and access a wide range of entertainment. To 'be

connected' included communication with their friends and remote family, as well as establishing new contacts. But as mentioned with regard to the topic about training is practice, the internet remained a 'black box' to be filled in by them later.

4.7 Learner agency: Following a plan as part of a bigger picture

The last specific research question, "How do they see newly acquired basic computer literacy helpful for their further engagement with ICT and for their individual plans?", was addressed in the interviews and the focus group around the issue of 'concerns' – in terms of what one cares about most – and subsequent practical projects. Questions examined, for instance, whether their engagement in a computer course served to enlarge the scope of enablements or whether it strengthened their commitment, determination and endurance to circumvent constraints. "Enablements are powers which, when intelligently used, help agents to stay ahead" (Archer, 2003:140).

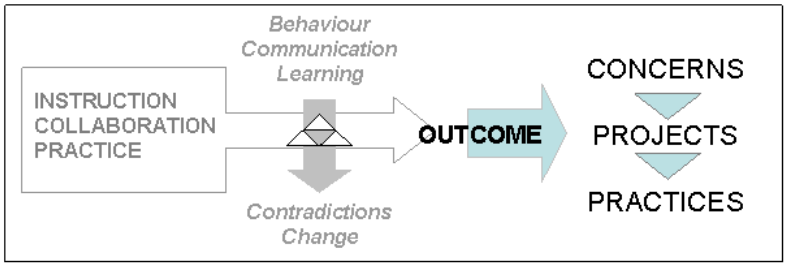


Fig. 12 – Analytical scaffold to look into learner agency (Making a plan)

In a wider context (Fig. 12), as mentioned in the short introduction of all five interview partners, they clearly had one common primary concern: obtaining work; they desired or put pressure on themselves to secure a job. This was the key issue that emerged in all their reflective deliberations, expressed not only by clear ideas about their future professional career, but also how their newly acquired knowledge and skills were helpful, useful, encouraging, and increased their confidence and personal strength.

In line with a growing importance of the linkage between personal agency and use (Czerniewicz and Brown, 2009), and supported by concepts that go beyond an access and skills perspective, like the concept of a *modus vivendi* (Archer, 2003) and the concept of technology identity (Goode, 2010), it makes sense to present a more 'vivid picture' of the main characters in this study to the reader. In continuation of the five stories (see Table 6), their accounts became more situated, adding how the role of technology knowledge affected young people who were striving to be computer literate (Table 7).

Table 7 – The five interviewees (Part 2): A nano-sized 'narrative'

Person	Profile – Part 2 (Analytical description in a nano-sized narrative form)
Luisa (F), 21 years; married, 1 child	Luisa needs to have her own place, move out from her parents place and build her family life in a different way. One of her kids might go to university, as she could not, maintaining her dream to be a medical doctor. In order to achieve that goal, both her and her husband need to work, a goal that comes first for her, and explains why she has attended a computer course. She feels supported by her parents and husband in achieving her 'dreams'. Her technological identity makes her confident to confront, follow and investigate new things.
Antonio (M), 20 years	Antonio wants to become a biology teacher, and is aware that he needs a scholarship to succeed in his plans to 'settle' in Inhambane province, working and living with his family 'and all this things'. He desires a different lifestyle to his father who moves around from one construction site to another. He needs computer skills for university and he sees IT development as a positive impact and good for him to be more informed and more selective.
Manuel (M), 20 years	Manuel wishes to succeed in his aspiration to become a project manager in the ICT sector. He expects – and wants – his family's life to be economically different from that of his parents. He consults his wider family for his reflexive deliberations. He likes and is curious about IT and is already benefiting from his course in his part-time work. He also wants to complete a hardware course, but most important for him is to find a job and to use the knowledge he has gained.
Maria (F), 26 years; married	Maria's 'dream' is to have a job, preferably in the health sector, and her efforts to become computer literate are part of her strategy. Her technological identity sustains her interest in continued learning and exchange within peer groups. She wants to stay informed and is keen about knowledge as a good influence. Supported and encouraged by her husband, her lifestyle is positive towards change and modernity. Short-term projects are finding a job and having a computer at home, a home she wants to create and improve over time.
Mateus (M), 23 years	Mateus pressures himself to find a job, preferably in the engineering sector. It is a daily concern and forms part of conversations with friends and family. He sees himself as a modern man and wants to work and live with own family in Mozambique. His technological identity is strong. He says that "Young people go with things" and benefit from IT development, stating also that today "things are more connected". The course was about skills and he might add an advanced level. "You can't enter a job and have difficulties", he explained. The course thus made him feel stronger: "I will not stop here".

Those coming from a low SEG environment wanted their lives to be different from those of their parents, although they maintained conversations with them and felt supported and encouraged by

them. Although the two female interviewees already had their own families, they still needed to have their own place. Both saw themselves with a still growing family in their own house, fully aware and in agreement with their husbands that both parents needed to work to achieve their projects. Moreover, the three young men, all with their own future families in mind, were seeking employment, although one wanted to try to enter university, depending fully on qualifying for a scholarship. Their desired different 'lifestyle' from that of their parents, as well as its economical implications, was reflected in their understanding of modernity and positive change.

Part B – Discussion

Building on the thematic structure that provided responses covering the broader context, the discussion also reflected on the findings in terms of theoretical insights to answer the research questions. A critical view on the digital divide supported unfolding learner agency in the context of acquisition of computer literacy in constraining conditions.

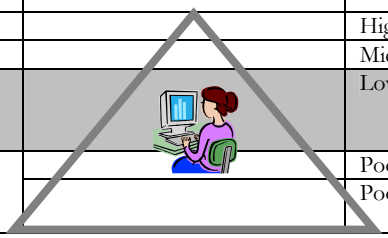
4.8 Understanding 'low socio-economic group' (low SEG) in the context of Mozambique

Part B of Chapter 1 introduced the developmental context of Mozambique as a so-called least developed country. Facilitated by ICT, people have become more aware of discussions around differences in poverty in the 'third world' and in developed countries. But poverty is not that simple to locate and classify. Poverty must be understood in its specific cultural-historical and socio-economic dimensions.

The findings in respect of the selected sampling group suggest a confirmation of the 'classical' definition for poverty of 1 USD per day. However, based on the findings and on my own local experience gained in the field of development cooperation, it seems important to mention that in Mozambique there are also important differences in referring to 'low SEG', the poor and the poorest – unfortunately for the affected population in the shape of a pyramid. Although national statistics refer to unemployment rates of around 20 percent, only about 15 percent of the national workforce actually has employment based on a formal work contract, according to their contributions to the national social system. This is also reflected by the fact that the majority of the participants in Phase 1 of the field study, including all five participants of Phase 2 and Phase 3, had been looking for their first employment for more than a year.

4.8.1 Understanding 'low SEG' in the context of the study

Table 8 – Low SEG in the local context

Income generation	Access/opportunity costs	Population	SEG
Formal and 'established' informal economic activity with some form of regular monthly income within the family			High SEG
			Middle SEG
	Opportunity costs high, but better access conditions than poor and poorest		Low SEG
Rural subsistence farming and urban informal micro economic activities	All forms of 'access' as a real challenge (with highest opportunity costs)		Poor
			Poorest

In order to improve our understanding of the socio-cultural and socio-economic context, it is suggested that the participants in the study from the selected sampling group can all be associated with the term 'low SEG' in the above visualised order (Table 8), thus justifying the expression of economically and academically disadvantaged young people, as stipulated by the vocational training centre for its targeted students. Nevertheless, there is one additional important point: although all interview partners are jobseekers and are within the economic spending range of 1 USD per day, this urban-based 'low SEG' has better 'access' conditions than the majority of the poor and poorest living in rural areas in Mozambique, according to the official household survey (2007).

4.9 Mobilising people *versus* digital divide: ICT access and use

The better 'access' conditions emerged when participants were asked about the experiences with ICT. Referring to Bourdieu's (1986) notion of capital, the experiences in form of skills, knowledge and practices are part of the embodied cultural capital. The findings clearly confirm that access and use of ICT in the group under investigation additionally includes, beside the classical forms of radio and TV, the mobile phone, which therefore constitutes an integrated disposition of one's *habitus*. Kyem and LeMaire (2006:7) mention that mobile phones "do not require the high levels of education and literacy as other technologies such as computer or the internet required of users, thus making them more accessible to a greater number of people". Even though the participants all came from a 'low SEG' background, only 4 out of 26 participants in the study did not possess a mobile phone, spending in average about a quarter to a third of their limited monthly monetary resources on staying connected.

4.9.1 Digital divide: Access in 'low SEG'

"The domestic digital divide is often a reflection of existing economic inequalities within a given country" (Gillwald, 2005, in Kyem and LeMaire, 2006:4) and "the existence of the technological gap

therefore has the ability to exacerbate existing inequalities in the global distribution of resources and economic development" (Rodriguez and Wilson, 2000, in Kyem and LeMaire, 2006:4). Investigating into ICT related issues and people coming from a poor background, or 'low SEG' as defined in the study focus, the findings suggest that the concept of 'digital divide' is subject to interpretation. Yet it is not about a simple reduction, as the interest is in the 'why' and 'how' digital technologies are actually being used in a local real-world situation.

Regarding the value of mobile phones in 'low SEG' and its implications of higher opportunity costs (Archer, 2003), it is necessary to consider the issue that all three interview partners living in the high-density outskirts of Beira had lost their previous mobile phones, either to theft or damage. This raises issues of quality regarding economic values, as well as security in the light of socio-cultural values and the phenomena of theft and robbery.

Without some insights into their 'real world', viz. of living in a poor neighbourhood, and in a high-density suburb in a least developed African country, any explanation of nuances of the 'digital divide' on their behalf becomes merely a theoretical exercise. One should think about what it means to own a mobile phone in such a context and what kind of considerations might come up in the inner conversation and in one's reflexive deliberations. Those issues would deserve a much closer look and a thorough investigation due to the critical dimensions, and hopefully, will receive attention in future research work. Archer (2003:136) refers to "their different placements and the different privileges associated with them mean that the same course of action is differentially costly to groups in dissimilar situations". In addition, higher opportunity costs as well as making sacrifices as consequence of their deliberations also represent a threat to strategic action.

4.9.2 Digital divide: Differential use of ICT

The mobile phone use of the respondents is primarily social, in line with general assumptions (Czerniewicz, Williams and Brown, 2009). However, as all five interview partners are not only looking for work, but also define 'having a job' among their important concerns, it is of interest that none has mentioned using mobile telecommunication for some kind of informal business or income generation activities. Mobile communication technology "offers opportunity to leapfrog stages of development, bypassing the need for expensive fixed capital investment" and "literally tens of millions of people were able to make a living as single-person businesses merely by owning a mobile phone and drumming up business" (Mills, 2010:200). Bourdieu's (1986) notions of embodied cultural capital, in form of ICT related skills and newly acquired digital literacy, and cultural capital in the objectified state might help to investigate this promising issue further.

The engagement with computers is new for the interviewees, and there is little access to computers and internet in their social context, as represented by their families, friends or school environment. Taking into consideration the rapid expansion of advanced mobile telecommunication networks that provide internet access, this may contribute to a potential shift in which "the powers of structural emergent properties" are experienced by more people "in relation to human projects in society" and in "their capacity to operate as constraints and enablements" (Archer, 2003:132). In this context, it is of interest to know more about, how people coming from poor backgrounds make choices to use technologies. However, it is also worthwhile to mention that a study in neighbouring South Africa in the environment of higher education found that, while ICT use is constrained by a lack of access, it is not necessarily enabled by the existence of access (Czerniewicz and Brown, 2009).

Due to their limited knowledge and experiences with the internet, the "subjective agential evaluation" regarding costs and benefits (Archer, 2003:141) appeared almost non-existent among the respondents, thus potentially jeopardising their contextual capacity to deliberate reflexively on their respective precise activities. However, their positive technological beliefs suggest "agents' own subjectively defined terms of trade" (Archer, 2003:143), which allow them to overrule "presumptions that bodily concerns automatically predominate" and "luxuries like mobile phones will uniformly be sacrificed" (Archer, 2003:143). In addition, they maintain an intense communication among peers about technology and useful applications for gaining access to significant information.

> For me it is like with my mobile phone. The first thing I knew was to attend a call and to call someone. After some time I was able to write messages, give 'bip' signs, play games ... and after the phone, I heard that here exists the computer and I followed that ... and I learned many things ... and can see that there are many more things. So I have to follow too … and when I succeed on that, other things will come up. (Maria – Appendix 8, lines 230-232)

4.9.3 Overcoming the digital divide: Striving to be computer literate

Before discussing the findings resulting from the analysis of learner agency in an activity system, it makes sense to address issues regarding the motives and choices of the interviewees that led to their respective participation in a computer course. Obviously one cannot seriously investigate to agency and structure without some recourse to wider influences, which are best described by the social 'milieu'. We have to acknowledge clear linkages between use and 'macro' elements of the social structure of society, as well as to understand the many dimensions of social life at the 'micro' level of the individual (Goode, 2010). Archer (2003:5) refers to "differential life-chances allocated to those differently situated in society".

> To stay informed, that has its price. (Antonio – Appendix 5, line 175)

As mentioned before, differential life-chances also means different opportunity costs in respect of the same course of action, but it stays within the human subjectivity and deliberations of the person if a "price is deemed worth paying" (Archer, 2003:4). Agents' subjective and reflexive formulation of personal projects – in given objective circumstances and under the influence of constraints and enablements – is a result of "a process that involves both objective impingement and subjective reception" (Archer, 2003:5).

> Not all do this course just because they want to know more about the world. Most do this course to have a greater chance to get employment. Because today everything is more difficult without technology. For me, what motivated me to do this course ... because 3 times I was already rejected for a job ... due to the limitations I faced. (Maria – Appendix 8, lines 95-96, 194-195)

Reflexive agents respond to impingements. They anticipate and act strategically, such as being more ambitious or going for the second best outcome. This freedom to determine one's own course of action – as expressed in their reflexive deliberations – keeps a person on track, or in other words, it determines the course of action to accomplish a project, representing a desired end (Archer, 2003). Archer continues in this context that causal powers, associated with constraints and enablements, are only activated if agents make use of their personal emergent properties, like formulating agential projects.

In terms of this line of thinking, interviewees are aware of the importance of formal credentials for their own future projects in the wider socio-economic context, or in Bourdieu's (1986) understanding of institutional cultural capital, of the importance of a certificate of 'cultural competence' which confers on its holder a conventional, constant, legally guaranteed value.

In response to the first two specific research questions, subsumed as "why do young people learn to use computers?", reference can be made to Selwyn (2005:131) who points out that "people's reasons for engaging with computer learning are not always straightforward" and that they may also carry "intrinsic-value aspects (functioning as an end in itself)". Responses from interviewees included using the computer itself as a goal, as well as their intentions to increase their employability. Some 20 years ago, Wheelock (1992, in Selwyn, 2005:130) highlighted "the entrepreneurial-cultural notion of learning to use a computer to develop occupational skills and employment potential". However, the majority of young people still do not have access to learning how to use a computer, thus providing evidence of inequalities in distribution of that change (Silva and Westrup, 2009).

4.10 The computer course as activity system

The interviews and the focus group discussion made it possible to follow up on participants' responses to create a better understanding between the interviewer and the interviewee, as well as to link investigative intentions, as represented in a structured scientific approach and the reality on ground. Using activity theory analysis was helpful for seeing the computer course as "a functional system of social and cultural interactions that constitutes behaviour and produces that kind of change called learning" (Russel, 2002:312), thus providing answers to the third specific research question regarding what motivates individuals to engage in a structured learning process, and what discourages them from doing so.

The selected methodological lens (Figure 13) enabled the investigation of agential stances within the defined basic unit of analysis (Engeström, 1987), composed by its nodes and relationships. The discussion of the findings focuses on outcome related issues, looking at contradictions within the activity system for change, in form of expansive learning through collaboration.

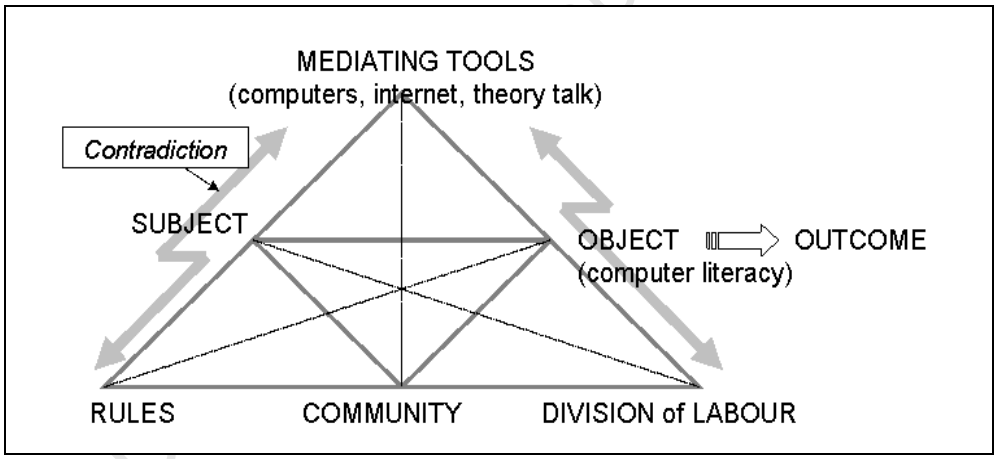


Figure 13 – Contradictions within an activity system

All interviewees not only had personal projects in mind that motivated them to attend a computer course, but they also had specific perceptions and expectations regarding the object of the activity: to become computer literate.

> …And when I entered, I learned more things ... more than I expected ... that was even better for me. (Manuel – Appendix 8, line 40)

The findings confirmed that, as long as there was a right mix of the mediatory tools and more competent instructors to present the theory and assist with the practical experiences, participants not only progressed in their learning efforts, but they were also highly satisfied. This was eventually also

one of the reasons reported by the interviewees for selecting a structured learning process, "whereby a culturally more experienced peer or teacher uses cultural tools to mediate or guide a novice into established, relatively stable ways of knowing and being within a particular, institutional context, in such a way that the knowledge and skills the novice acquires lead to relatively lasting changes in the novice's behaviour, that is, learning" (Hardman, 2007, in Hardman, 2008:66).

> The instructor can teach me about things I don't know, and what I try to learn. Along this, I can make myself sure of what I am saying ... they correct me and put me on track of what I really want to know. (Luisa – Appendix 4, lines 124-125)

Referring to Vygotsky's pedagogical conceptualisation of a mediational process within the ZPD, two forms of expansive learning arise from that interplay. Either "it contributes to an enlarged room to *manoeuvre* for the individual", or it is "mediated by the division of labour in collaboration" (Roth and Lee, 2007:205). In that sense, a less experienced person may observe and act upon unfolding new actions, or two individuals may collaborate on these.

> Yes, sometimes we were two persons at one computer, and from there many ideas emerged. That helped to investigate and explore. (Maria – Appendix 3, line 253)

However – and here lies one of the analytical strengths of activity theory – having two persons sharing one computer may also lead to passivity and frustration, and it may even be offensive. Why does the same physical situation, two people sharing one computer, sometimes create disruptions, and sometimes not? Such situations occurred, usually when the instructor had to take on another role instead of focusing on the teaching tasks. A breakdown of a computer in conditions with a limited number of second-hand machines created a challenge and forced the instructor to act as administrator, thus minimising the effects of the breakdown without interrupting classes. However, it would be wrong to think that the course participants did not have high expectations, or that they should not complain because they came from a poor background, and because they were attending a course that was providing vocational training to disadvantaged young people.

"Whereas inner contradictions reveal themselves only during analysis, they express themselves as trouble in ongoing activity" (Roth and Lee, 2007:204), as expressed during the focus group discussion:

> Antonio: Sometimes a computer had a defect, so we were placed 2 persons at 1 computer. That was annoying.
>
> Luisa: To tell, 2 persons sitting at one computer did not bother me. But what happens is that there are certain instructors that do not give a chance to the other person aside. Sitting 2 persons, you need to investigate more things ... but the instructor said, if you already know, you may go home ... that is a mistake. There are people coming from home that have all the will to learn, but they might end up to loose their will … because this is offending.

Antonio: I said that because what caused my frustration was once when I was sitting next a girl ... I know something, and she too ... what happens is … the instructor tells you know everything, so let her, to practice … so you end up assisting. That made me passive, just sitting in the corner and watching. But I also needed to try out things ... but the instructor said: let the woman, let the woman.

Maria: But I think it was good for us. Because we were sitting 2 persons at 1 computer, a woman and a man. It gave time for both of them, it was not only one person practicing. I think we had a good instructor ... he gave us time, there's the computer ... and even when he didn't explain the things, we had our own ideas in our mind even without some explanation from the instructor ... us two ... that is a question of understanding. But it cannot be only one person assisting and the other practicing.

Luisa: Here it was like that ... 2 persons on 1 computer is not wrong. What happens is that our instructor, putting together 2 women, with one understanding less, the instructor says 'give the mouse to the other one' that does not understand anything, who is not getting it well. So we try to discuss something … to be practical ... but I have only 5 to 10 minutes to learn. Then I am thinking that I have to leave home, pay transport ... and at the end of the day I learned nothing.

(Conversation flow during focus group discussion – Appendix 8, lines 108-140)

Roth and Lee (2007:203) point out "when inner contradictions are conscious, they become the primary driving forces that bring about change and development within and between activity systems" and list 4 types of contradictions that subjects can experience: (1) inner contradictions of some object, (2) between two constituent entities, (3) between the object (motive) of the dominant and the object of the culturally more advanced from an activity, and (4)between the central activity and one of its neighbouring activities.

Referring to some of the statements made during the focus group discussion, activity theory revealed some contradictions. A comment mentioned and reported earlier on in the findings, appreciated the step-by-step process and same level of participants as one of the personal selection criteria to take a beginners course. That is not automatically the case as participants have different social backgrounds. Bourdieu (1986) explains about the symbolic efficacy of cultural capital by referring to the logic of its transmission. Appropriating cultural capital is a process over time and depends largely on the cultural capital embodied in the whole family.

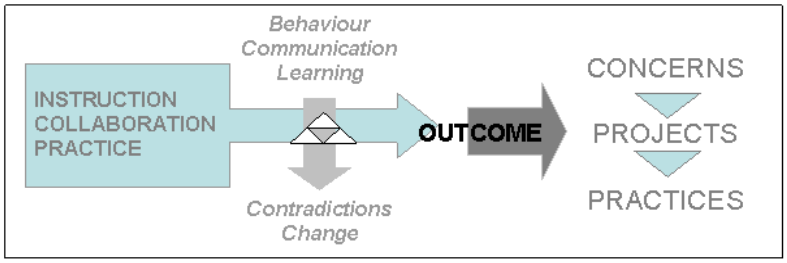


Fig. 14 – Analytical scaffold to look into learner agency (Outcome as linking element)

The analytical review of the above conversation flow also revealed another important finding: not only did the young learners only make up their mind to do a computer course, but they also saw their efforts within a bigger picture. Striving to be computer literate had a specific purpose for them,

and they expressed clearly the link between object/motive and outcome (Fig. 14). They were aware that "bonuses accrue to those who successfully extricate themselves from under-privileged or problematic positions" (Archer, 2003:136).

Interviewees' comments on gender related issues also confirm the suggestion that adolescent girls are comfortable with and involved in technology related activities, and that adolescent boys do not regard girls' use of computers as in any way unusual (Williams, 2006).

Hence, using an analytical approach reveals the contradictions and dynamics within an activity system that is geared for change. Such change builds on the expansive learning experiences as shown in the positive examples of collaboration, thus contributing to the expected or desired outcomes. Working on situated problems in interaction with a more competent person not only helps in integrating the positive aspect of everyday practice (Hedegaard, 1998), but also contributes to identity formation, as "classroom instruction results in the incorporation of class activities into the life projects of students" (Lave, 1996, in Hedegaard, 1998:120).

4.11 Learner agency: Following a plan as part of a bigger picture

> Courses of action are produced through the reflexive deliberations of agents who subjectively determine their practical projects in relation to their objective circumstances. (Archer, 2003:141)

The purpose of this research was to study young learners, as agents, in their efforts become computer literate, by asking them about their motives, perceptions and expectations, thus exploring into their reflexive deliberations, which allow agents to play a highly significant part in shaping their own lives and actively mediating their own social conditioning (Archer, 2003).

During the interview, participants were also asked if they consciously practiced 'inner conversations' and all of them confirmed that they questioned, evaluated and reflected on themselves. In addition to responding to questions about their past experiences and present judgements, they also spoke of their future expectations and aspirations. Archer (2003) points out in this respect that it is necessary to distinguish analytically between the pre-dating 'Me', conditioning the doings of the 'I', that itself shapes the doings of the post-dated 'You' to 'understand the bearing of the past upon any current inner dialogue or the effects of that inner exchange upon the future.

4.11.1 The *modus vivendi* and the trajectory 'concerns > projects > practices'

As referred to in the findings, the last block of questions during the interviews and the focus group meeting looked at participants' future plans, taking into consideration that "we have our unique configuration of concerns to pursue – the projects that derive from and consolidate our personal identities" (Archer, 2003:115). What we care most about and to what we relate accordingly our commitments, is formed within a 'triad of concerns'. These are concerns about our physical well-being, our performative achievements, and our self-worth (Archer, 2003).

"Most of the time, each person has to work out their own *modus vivendi* in relation to the three orders" (Archer, 2002:16) as an active and reflective agent. Internal conversation as an attempt to understand where we do stand socially and reflexive deliberations of what we can do about our personal concerns are finally expressed in our practical action "as only way to resolve the tension between personal aspirations and social expectations" (Archer, 2003:123). Thus, the *modus vivendi* is an achievement; not one which can be accomplished immediately and not one which can necessarily be sustained (Archer, 2002).

> Hmm ... I think I will be a different person ... a person already adult, with lots of dreams that I did not materialise yet. My dream is ... I want to have a job. My own money with my family ... living with my family. In 5 years ... it might be the same place, but already different ... a good house with some minimum conditions. (Maria – Appendix 3, lines 292-298)
>
> Move out the house ... having my own house … living at a place like ... a place that I really need to have, that I have to build. I would like to see both of us working ... and having more kids, but not that many (laughing) ... four of them ... because now to live, the life is difficult … but maybe one can study one day at the faculty, succeeding to do the monthly payments, inscription… (Luisa – Appendix 4, lines 171-172)
>
> "What we are all trying to do is to establish a *modus vivendi* in which our concerns always play a role, even under stringently restrictive circumstances." Archer (2003:144)

Although the methodological choice of the study was not to use narratives, as a biographical study could generate valuable data, the chosen approach does provide the space for the interviewees to show the strategic character of their practical action to become computer literate. Obtaining a certificate has its value for them – in the form of institutionalised cultural capital (Bourdieu, 1986) – but they are very much aware that in the real world of work one needs to have the necessary skills too, in form of embodied cultural capital.

They are not only striving to be computer literate, but they are also striving to satisfy their ultimate concerns, thus establishing their own *modus vivendi*. Following Archer's trajectory, they know what it means for them to have a job in this context (concern), they do understand computer literacy

(project) as a personal pre-requisite, and they are aware what is at stake if the object (practice) does not meet the necessary outcome.

> So in the end it's up to you to understand that this course is important for you. (Maria – Appendix 8, line 87)

In response to the last specific research question, namely, how the acquired basic computer literacy will influence them in the near future, all interviewees were convinced that it would help them, notwithstanding their realisation that the computer course was only one step in the right direction. However, there is a risk that, despite their good intentions, learning to use computers will not result in actual eventual use and utility (Wheelock, 1992, in Selwyn, 2005:131). Limited access to a computer continues to be a constraint in their real-life situation, but "the primary benefits of formally learning to use computers appear to be in the informal opportunities for further practice and learning they offer" (Selwyn, 2005:134).

Chapter 5
Summary and recommendations

Part A of this Chapter summarises the key findings according to the original research questions to reflect on learner agency regarding computer literacy in a broader context. Based on the four specific research questions (SRQ1 to SRQ4) and the overall research question (RQ), the social processes surrounding an individual learner's use of technology are highlighted and discussed within the concentric model of the adapted theoretical and analytical framework. Part B reviews the research process, identifying limitations and making recommendations, with the intention of encouraging further research that contributes "to develop scientific accounts of the often compromised and constrained realities of education technology use on the ground" (Selwyn, 2010:65).

Part A – Conclusions in relation to the findings and the research questions

The emphasis on 'use on the ground' in a critical approach means that attention must be paid to "how digital technologies are *actually* being used" (Selwyn, 2010:66). Part A reiterates the key findings of this study to appreciate how and why technology-based learning takes place in 'real-life' contexts.

5.1 Disadvantaged young learners and digital divide

"ICT is changing the way many Africans live and work" and "create totally new opportunities for human progress" (Kyem and LeMaire, 2006:13), though issues around access to and use of ICT reveal "inequalities in the distribution of that change" (Silva and Westrup, 2009:61). The principal goal of the study was to explore the issue of inequalities in use and access to ICT, which can also be described as a digital divide, in the local context of economically and academically disadvantaged young people striving to be computer literate, as inspired by Mills (2010:48) critical view of an "urbanised African youth representing a source of energy and talent". This provided a suitable setting with a focus in terms of an activity system to be analysed. Furthermore, the "lived experiences of individuals and how these differences shape future opportunities" (Goode, 2010:13) allowed some insights into learner agency and identity in relation to enabling and constraining factors.

Van Dijk (2006) questions to what inequality the digital divide concept refers to and what exactly is new about the inequality. Issues like the global, social and democratic divide (Fairchild and Quansah,

2007) are relevant in the particular context of this study. In addition, Goode (2010) stresses the need to look at the intersection between cultural backgrounds, gender and technology.

5.1.1 ICT for empowerment: What kind of affirmative action?

"Changes in technology and the emergence of social (Web2.0) technologies, which foster diversity and collaboration, can take the transformative potential of ICT and remake itself as a more plural and collaborative form" (Tompson, 2007, in Silva and Westrup, 2009:60). ICT, and particularly the 'anywhere, anytime' mobile technology, helps to create personal identity; in addition, it facilitates assemblies of activists or unrelated people at a moment's (Kyem and LeMaire, 2006). Although the literature review did not identify local data on mobile phone use and socio-economic empowerment in terms of the establishment of more efficient small businesses, or the creation of jobs and new forms of income generation (Mills, 2010), my personal observations support the impression of a high penetration by mobile phones, having in my mind the market ladies with their mobile phones clipped between shoulder and ear while busy attending to customers. This does not necessarily indicate the social or economic nature of their conversations, and until further research provides reliable data, one should be cautious not to expect individual economic benefits to happen automatically, just because the technology exists.

More and more people in Beira are using mobile phones to meet their everyday needs. Supporting general assumptions (Czerniewicz, Williams and Brown, 2009), the participants in the study use them primarily for private purposes and see them as socially integrative. Considering the findings as well as the media reports about the food riots organised via text messaging (Chapter 1, Part B), the internalisation and externalisation of the basic uses of mobile communication in a context obviously take place, be it to overcome 'chronic' constraints such as having 'no credit', or participating in spontaneous action, as witnessed in the riots. Emerging new forms of using ubiquitous tools are part of a society in change (Kyem and LeMaire, 2006), but also of a society in pain.

5.2 Experiences with ICT and technology identity

> *(SRQ1) What are the prior experiences of young computer course participants with ICT and why do they engage with such technologies?*

Mobile telecommunication in Africa can be regarded as the single greatest sustainable stimulus (Mills, 2010), and the conversations with my interview partners confirm that the mobile phone is indeed part of their lifestyle, or *habitus* (Bourdieu, 1986), in terms of acceptance, appreciation and

perceived usefulness of the technology. Findings confirm a desire to be *always connected* as part of a 'technology identity' (Goode, 2010) and – in relation to the concentric model – they experienced a positive impact in their direct environment (family, friends and school), and increased awareness towards opportunities among their community and society.

Further, it is interesting to see that their personal and social identity seems to prevail when it comes to important interpersonal issues (see Chapter 4, 4.3.1). The three male respondents regarded the 'tactical use' of mobile phones to avoid dealing with important matters within their inner family circles as unacceptable. The two female interviewees, however, sometimes used text messaging to 'knock on the door', in other words to address more difficult issues strategically before meeting their relatives in person. Vygotsky's (1978, in MacCleod, 2004) notion of intellectual reasoning, which is based on the fact that the psychological tools that emerge from culture over time structure mental activity, provides a hypothesised approach that links change and the variation of cultures and intellectual activity.

Comparing usage patterns and the level of satisfaction regarding the uses of their mobile phones, the underdeveloped level of digital literacy skills of participants does not seem to provoke dissatisfaction regarding the limited technical functionalities of their basic mobile phones, with all five interviewees *using their mobile phones exclusively for social functions*, limited to calls and text messaging. However, this does result in a failure to explore available and progressively developing mobile technology to its full potential, and to engage with the greatest sustainable stimulus for economic growth and income generation in Africa. Czerniewicz, Williams and Brown (2009) suggest that, in order for future research biographical studies to be valuable, they must specify the causal mechanisms, a claim that is supported by the findings of this study, where all five respondents were jobseekers; they were not exploring the potential uses of ICT for development (Silva and Westrup, 2009). Although all interviewees were using mobile phone every day, spending between a quarter and one third of their monthly expenses on communication (Appendix 1b), not one mentioned the entrepreneurial potential of 'earning a living' by using mobile telecommunication.

5.2.1 The internet as a 'black box'

The issue of the internet was highly interesting, not only because it represents, in combination with access to a computer, the widespread simplified or 'classical' view of the digital divide. Feedbacks during all 3 phases of the study suggest that respondents linked the internet directly to a computer (see Chapter 4, 4.6.3). Firstly, they regarded the computer primarily as a way of making work easier, either for school or in a job, and secondly, they regarded it as providing access to the internet. Only

two respondents had used their mobile phones to connect to the internet, and they had only done so sporadically. Although several interviewees eventually had the internet 'in their hands', it was not yet 'in their mind'. *The internet without practical experience turns out to be a 'black box' for them.* This means that they have so far been unable to explore the digital potentials to participate and benefit as active member of the community and society. These differences became particularly visible during the focus group discussion, when two participants, who had gained practical internet experience during their course, met with the group that had not had any physical internet access at the computer laboratory.

Yet, all 5 interview partners demonstrated a positive technology identity in terms of their own beliefs, their own abilities, their motivation to learn, and the importance of technology in their lives. Goode (2010) suggests that holding a particular technology identity affects individuals' academic and social life, thus suggesting that precise opportunities are needed to support the participants' ongoing endeavours – such as their expectations regarding their engagement in a computer literacy course.

5.3 Computer literacy: A step towards participation

> *(SRQ2) What are the individual perceptions and expectations of young learners regarding their engagement in a computer literacy course?*

With regard to the concentric model, findings show that conversations within peer groups and family members influenced the participants' motivation and their decision to sign up for a computer course (see Chapter 4, 4.4). Interestingly, the interviewees focused on the basics of wanting to 'know' a computer. They were keen to find out basic things, such as how to handle a computer physically, by referring to hardware and software. This makes sense, as they perceive computers as globally present tools, even though, in their local context[14], there were still few computers 'visible' to them and even fewer people had personal experiences of them (Appendix 1b).

All the interviewees value literacy as a step towards participation in society and the economy, and they are aware that it is helpful to weave together their personal experiences, basic and advanced skills, linking individual skills with social practices, and crossing the boundary between formal and informal learning (Livingstone, 2008). They expect from a private provider the knowledge benefits of a structured learning process, reflecting on their own school experiences in constrained conditions.

[14] The national household survey in 2007 shows that, of 94,804 households in the city of Beira, only 3,493 possess a computer. [Online] Available: http://www.ine.gov.mz/censo2007/rdcenso09/Sofala.

Respondents are not aware of issues regarding convergent literacies for convergent technologies (Livingston, 2008). They had two main reasons for attending the course: 'Getting a job' and access to the internet. Each of them saw the computer course as a pre-condition.

5.4 The computer course as space for collaborative learning and identity building

Using activity theory analysis (Engeström, 1987) and regarding the computer course as an activity system, and agential stances from the interviews and focus group as the smallest unit of analysis, worked well in practice. In fact, these stances – as used and presented extensively during the previous chapter to maintain the authentic character of my approach – are already powerful on their own, but activity theory is helpful to locate them even more precisely while revealing the relationships.

Beyond that, activity theory as an analytical tool has a built-in link of motive/object and outcome (Engeström, 1987), a crucial and bridging element to draw on Archer's (2003) trajectory of 'concerns > projects > practices' and the concept of a *modus vivendi*. Both are essential, firstly, to understand motives of active agents in constraining conditions, and secondly, to investigate how agents act strategically to accomplish projects to satisfy their concerns.

Archer (2003:136) explains that acting agents – in this case academically and economically disadvantaged young people striving to be computer literate – are aware that "bonuses accrue to those who successfully extricate themselves from under-privileged or problematic positions".

In order to benefit most from their participation in a computer course, all five interviewees

- *made sacrifices* – such as investing their time and money; for example, Luisa, had to reduce her presence at home to care for her baby, which added the daily struggle of finding someone else to look after her baby;
- *acted strategically* – such as reflecting on their motive in relation to their concerns, selecting the place that was most suitable for them, and staying focused on the outcome while demanding their time to practice; and
- *were confident* about what they got out of their efforts, representing a positive indicator in regard to their perceptions and expectations.

Certainly, those experiences contribute to the participants' self-awareness and strengthen their personal identity while "engaging in a world conditioned by social relations of privilege and

disadvantage" (Wheelahan, 2007). In addition, newly acquired knowledge and skills relate positively to their technological identity and increase, based on their life experiences, their future options in the sense of 'situational relevance' (Selwyn, 2004, in Goode, 2010:5).

> *(SRQ3) What motivates them to engage in the structured learning process to become computer literate, and what discourages them?*

Four key components are representative for how the interviewees acquired their knowledge and skills along the structured learning process (see Chapter 4, 4.6). As all came from a 'low SEG', *physical access to a computer* during the course was essential, even more so as many of the 26 participants in Phase 1 of the study were sitting at a computer for the first time. This is reflected by the local context, where only 5 percent of the urban population in Beira is actually using a computer, and only half of them accessing the internet, within a period of 12 months (National Household Census, 2007).

It is the own choice of the interviewed young people to give preference to a structured learning process, and the role of the *instructor* as a culturally more experienced peer or teacher (Vygotsky, 1978) is fully appreciated. This can be partly explained by the very limited opportunities for informal learning, whether it be physical access to a computer, or learning with a more experienced peer. In addition, the combination of *theory and practice* is cited most by the interviewees as reason to benefit from a computer course, thus reassuring them that they have made the right choice. *Collaboration* is experienced too, as expansive learning within the ZPD (Vygotsky, 1978), as long as it represents an integrated part of the pedagogical approach and is not contradicted by unguided accidental sharing of a computer due to a technical breakdown. In this sense, all four key components carry the potential to disrupt the progress of a structured learning process, situations in which activity theory provides the right tool to look into emerging contradictions.

The importance of the physical and technical conditions of the mediating tools is obvious. Technical breakdowns happen, and logically, they happen more often if temporary conditions only allow access to second-hand computers. In such a situation, the instructor becomes an administrator to keep the class going. Although this is a reality, active learners clearly understand the relationship of motive/object and outcome, and thus feel highly uncomfortable if their learning success is in jeopardy. This is understandable, as opportunity costs are already higher for 'low SEG' learners and not accomplishing a project is risky (Archer, 2003). Similar feelings are reported by course participants when they have to share a computer, when persons of different skills levels have to

share a computer, and when they have no chance to practice, as was the case at the location that had no internet connection.

5.5 Learner agency: "Yes, I do have a plan, I cannot stop here"

A focus group discussion is very helpful in analysing collaborative learning experiences and the enabling and constraining factors of objective circumstances. It is striking to see how the interplay among group participants provided an opportunity to explore an issue, until they reached a point where they felt satisfied that their thoughts, experiences and positions have been expressed and acknowledged fully. Although they came from a so-called poor background and had only met each other for the first time, an active and open minded discussion ensued, allowing them to share their experiences and thoughts.

The analytical link between motive/object and outcome helps in investigating the construct of learner agency in the context of the acquisition of computer literacy. Defining the computer course as an activity system – with basic computer literacy as the object – allows the outcome on an activity to be investigated (see Chapter 4, 4.6.3):

> *(SRQ4) How do they see newly acquired basic computer literacy helpful for their further engagement with ICT and for their individual plans?*

Situating the activity system in a broader context, as represented by the successive circles, opens a view to a complex issue that affects all 5 interviewees: their current efforts in shaping their lives can be associated with objective circumstances of very limited formal employment opportunities in Mozambique.

In addition, their individual efforts to mediate their own social conditioning have two issues in common that relate the computer course and its expected outcomes. One, mentioned just before, is *job* related. The other one is about the *internet*. Throughout the interviews and the group discussion, these two issues were present in the conversations. Whereas they see basic computer skills essential for being more efficient in school or work related tasks, the internet is essential for being connected, whether for social purposes, or to be informed better. Findings suggest, however, that the interviewees will not be able to build on lived experiences that link the potentials of new technologies in terms of their situated relevance (Selwyn, 2005) regarding socio-economic empowerment (Mills, 2010).

In this context, the five respondents see their engagement with ICT as a continuous effort, supported by their beliefs about their "ability to use technology, the essence of typical computer use in the context of opportunities, the level of importance attributed to technology, and motivation to learn more about computing" (Goode, 2010:11). Within their own plans for the future, all 5 interviewees already have the next structured learning input in form of a course in mind, to increase their knowledge and skills about computers, or alternative to combine it with job-related training courses, thus increasing their employability.

> *(RQ) Why do economically and academically disadvantaged young learners choose to engage with ICT and what role to they see for computer literacy?*

Having the respondents 'social milieu' in mind, their realistic description of what Archer (2003) refers to as the *modus vivendi* is a strong indicator that those young learners do not only have plans for the future, but furthermore, they are strategically relating their participation in a computer course as a practical action towards their concerns: a basic, but important step, in which they open the door that connects their real world with the 'digital world' as well as developing occupational skills and employment potential (see Chapter 4, 4.7 and 4.11). The findings show that they had a positive technological identity, which was contributing to their confidence and further engagement with ICT.

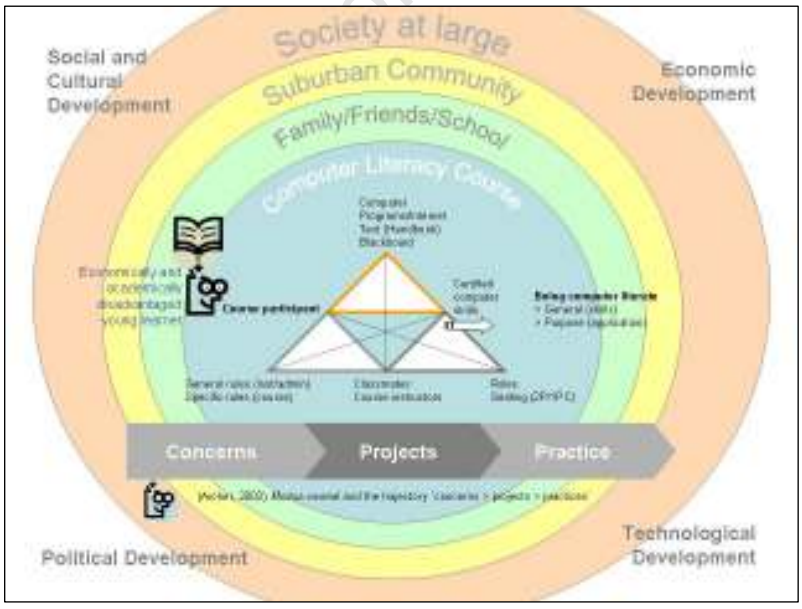


Fig. 8 – Schematic overview: Concentric model based on activity theory and supportive concepts

Referring to the concentric model (Fig. 8, see also Chapter 2), which places the 'micro' level of the individual participating in a basic computer course in the broader context of the 'macro' elements of the social structure, one must be aware that the reported access constraints exist in their 'real-world' context. However, "access to ICT for the promotion of social inclusion cannot rest on the provision

of devices or conduits alone. Rather, it must entail the engagement of a range of resources, all developed and promoted with an eye toward enhancing the social, economic, and political" of the individual, the communities and society at large (Warschauer, 2002:9).

Part B – Review of the research process, limitations and recommendations

Part B reviews the research process in a reflective manner, including limitations that were encountered during the study, and suggests directions for further research to arrive at a more socially grounded understanding.

5.6 Review of the research process

The study set out to explore the engagement of young people in their real-life context with ICT in the broader context of needing to use technology for social inclusion. Drawing on activity theory (Engeström, 1987) and on Archer's perspectives on the agency/structure relationship, suggested a theoretical and methodological framework to examine agency in a particular learning environment within a broader socio-cultural context. This critical approach to learner agency in constraining conditions is reflected by adopting a concentric model (Lim, 2002), representing the activity system in the broader context and blending it with Archer's (2003) concept of a *modus vivendi* and her trajectory 'concerns > projects > practices' (see Chapter 2, Fig. 8).

To compensate for the lack of empirical work in the local setting, an exploratory strategy in combination with a mixed-method approach proved helpful during the fieldwork (see Chapter 3, see Fig. 9). The three phases comprised questionnaires, individual interviews and a focus group meeting, which contributed to the analytical process and addressed validity issues through triangulation.

The selection of a suitable research site was conditioned by the research focus on economically and academically disadvantaged young people striving to be computer literate. Although the primary location fulfilled the key criteria regarding its clients, one must be aware that institutional computer course providers themselves operate in constraining conditions. The temporary lack of internet access for course participants at the selected location was felt as a limitation for overcoming the digital divide, which has arisen due to the rapid diffusion of the internet into daily life and the explanation of internet usage differences, with the level of digital skills as one of the most important factors (Van Deursen and Van Dijk, 2009). This led to the decision to include computer course students from a second location with internet access. An interactive approach (Maxwell, 2008) gives

rise to a complex research process, which generated additional data that thus contributed to the validity (spatial triangulation) and relevance (practical experiences with internet) of the study.

The analytical part of the study built on the two-fold strategy that was applied in the mixed-method design during the fieldwork, where each phase was broken down into themes that were linked to the research questions (Appendix 2). The thematic structure provided responses covering the broader context of the concentric model. Giving priority to learner agency and exploring "why technology-based learning actually takes place in 'real-life' contexts" (Selwyn, 2010:67), came at a cost of the other dimensions of social life at the macro level. However, the attempt 'to develop context-rich accounts of the often compromised and constrained social realities of technology use on ground' (Selwyn, 2010:66) was addressed by the purposeful selection of the study participants from a low SEG.

Including authentic agential stances in the findings and the discussion created a vivid picture of the local settings. In addition, and in line with an exploratory approach, with little local research data accessible so far, agential stances may also facilitate future research work to link up closer to the source, and not its sole interpretation.

5.7 Further research: For a more socially grounded understanding

Neither the scope of the selected research arena, nor the adapted methodological approach of the study made it possible to explore in full the concept of reflexivity, underpinned by the cognitive uses possessed by embodied agents (Archer, 2003). However, examining the agential stances related to the *modus vivendi* did provide some notions of the communicative reflexives, in their search for stability and a focus on family, and the autonomous reflexives, namely, looking for change and work as a driving element to achieve satisfaction.

Continuing along this thread and relating it – in the spirit of a critical social realist's position regarding poverty and social justice – future research in Mozambique, surrounding technology education as well as educational technology, could study Archer's (2003) concept of reflexivity. By drawing on her typology, which includes 'fractured reflexives', a better and personalised understanding of the poor and poorest in society may be helpful in exploring further the potentials of ICT for development and social inclusion. After all, poor people represent the majority in Mozambique and it matters to understand how they relate with and benefit from rapid expanding mobile telecommunication and innovative services.

Areas of further research could address the pedagogy in basic computer courses offered in formal training institutions. Young people show an interest in becoming computer literate, without having much idea about what embraces the scientific concepts of digital literacy. Most likely, the course providers do not either. Why that is so and how to improve a structured learning exercise thus becomes even more important, as the development of digital technologies poses challenges to institutional traditions of learning (Säljö, 2010). By defining the activity system as unit of analysis to uncover contradictions and to look for a change called learning, activity theory offers also a suitable methodological tool for future research work in the pedagogical domain (Hardman, 2008; Lim, 2002).

As adapted in this study, blending activity theory with critical realism, as represented by Archer (2002, 2003) in her morphogenetic realist social theory, or elaborating further, by drawing on her topology of reflexivity, opens promising new research opportunities to theorise and investigate the relationship between the individual and society. To highlight individual agency, and combining it with learning – for a workplace or in workplace learning itself – to facilitate a broader individual development and address unequal power relationships that structure the socio-cultural context (Wheelahan, 2007), surely makes sense, as does developing social scientific accounts of the use 'on the ground' and generating greater interest in the issues of democracy and societal justice surrounding the research field (Goode, 2010).

This study has followed this direction, by applying a critical approach to study the digital divide, although in a least developed country like Mozambique the lack of access and skills continue to affect many young people. However, it has been encouraging to observe that young people participating in the study, despite coming from an economically and academically disadvantaged background, had a positive technology identity that motivated them to become computer literate and that further increased their keen interest in further engagement with ICT.

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Appendices

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Appendix 1a – Original questionnaire (incl. Introduction and consent clause) in Portuguese

INFORMAÇÃO sobre esta PESQUISA e sua participação

Peço ler a seguinte informação antes de iniciar este questionário.

Caro estudante do curso 'pacote de programas da informática MicroSoft'

Esta pesquisa faz parte duma investigação sobre o papel do indivíduo - seus motivos, decisões e acções - num ambiente desafiante com os seus constrangimentos e as suas possibilidades. Em outras palavras, porque você escolheu a frequentar um curso para obter 'aptidão para informática'.

Porquê estou a fazer isto?

Em geral - num curso de informática - examinar quais são as reflexções e deliberações internas da pessoa relativamente ao contexto em que vive, com os seus constrangimentos e possibilidades. Ainda mais, qual é o papel dos TCIs (tecnologias de informação e comunicação) neste processo, ou na educação: Sua importância na 'alfabetização digital' para a própria pessoa.

Quem é o investigador?

Esta pesquisa é feita pelo Christian Zeininger, mestre em ciências sócio-economias, no âmbito da sua dissertação para obter o mestrado em tecnologias de informação e comunicação na educação, na Universidade da Cidade de Cabo (UCT), África do Sul.

O que pretendo com esta pesquisa de você?

- Para hoje: Terminar este questionário, junto com os seu contacto (celular) e a sua informação sobre a sua vontade em participar mais tarde numa conversa particular (dar uma entrevista de uma hora e participar uma reflexção em grupo de uma hora) para aprofundar os dados obtidos neste questionário.
- Para a segunda fase são previstas entrevistas individuais (em total procuro quatro pessoas) e a seguir uma reflexão em grupo (com as mesmas pessoas). Peço indicar o seu interesse se quer participar. Em caso que você foi selecionado/a vou contactar você para acertar durante o mês de Agosto a data para estes encontros (provavelmente antes ou após duma aula).

A sua participação é voluntária. Em completar e retornar este questionário você está de acordo a participar nesta pesquisa, como também da publicação dos resultados. Igualmente garanto manter o anonimato da sua pessoa. Em caso que você quer deixar a sua colaboração com esta pesquisa, você pode retirar o seu consentimento.

De que forma vou usar os dados desta pesquisa?

Trata-se duma pesquisa anónima. A razão de pedir o seu contacto (celular) serve somente para entrar em contacto para uma eventual entrevista e conversa em grupo. Não é necessário deixar o seu numero de telefone (em caso que não tem ou não quer) nesta ficha para a sua participação. Os resultados desta pesquisa vão ser publicados, mas posso garantir que qualquer informação obtida em relação com esta pesquisa está sob confidencialidade. O seu nome real nunca vai ser usado na publicação dos dados obtidos.

Como se garante a confidencialidade dos seus dados?

Mante-se o seu contacto (numero de telephone, em caso que facilitou) numa base de dados separadamente dos dados da entrevista e conversa em grupo. Ainda mais, se usa pseudóminos (personagem fictícia) para qualquer referência aos dados que você fornece neste questionário ou durante as conversas.

Por favor, guarde esta folha de informaçao. Em caso que você tem qualquer duvida ou questão sobre a sua participação nesta pesquisa, peço a entrar em contacto comigo.

Christian Zeininger
Investigador

Contactos do investigador
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Telemóvel: 84 7832065

Appendix 1a – Original questionnaire (incl. Introduction and consent clause) in Portuguese

Parte 1: Acesso para e uso de TICs* (enfoque: aprendizagem)

*TICs (Tecnologias de Informação e Comunicação) como **computadores**, infra-estrutura (inclusivo **Internet**), programas e aplicações (software), e tecnologias associadas como data-show, **celular** (**telemóvel**), netbook, etc.

1 Quando você começou usar um computador **pela primeira vez**?

① Neste presente curso ② Neste ano (2010) ③ No ano passado (2009)
④ Nos últimos 5 anos ⑤ Já mais do que 5 anos (especifique quantos anos, se possível: ___anos)

2 Como você apreendeu **inicialmente** usar um computador?

① Auto-ensino (próprio) onde _____ ② Com a família (quem)_____ ③ Com a família (onde)_____
④ Com amigos em casa deles ⑤ Com amigos no internet-café ⑥ Neste presente curso
⑦ Na escola _____ classe _____ ⑧ Num centro comunitário (gratuido) _____
⑨ Outra forma (explica, por favor) _____

3 *Eu acho que ..*

	Fraco	Normal	Bom	Excelente
Os meus conhecimentos e **aptidão** para usar um computador são:	①	②	③	④
Os meus conhecimentos e **aptidão** para usar um celular (SMS, Internet) são:	①	②	③	④
Eu acho que ..	Zero	Fraco	Normal	Excelente
Os meus conhecimentos e **aptidão** para usar serviços disponíveis na Internet são: .	①	②	③	④

4 Para os seus estudos e/ou aprendizagem, **aonde** você vai para ter acesso às TCIs (fora do curso que você participe aqui actualmente)?

① Eu não tenho acesso fora deste curso ② Onde eu vivo (casa, lar) ③ Amigos ④ Internet café
⑤ Centro comunitário ⑥ Escola ⑦ Meu lugar de trabalho ⑧ Outro _____

5 Fora deste curso você usa **normalmente** que tipo de tecnologia (TCIs)?

① Não uso um computador fora do curso ② Computador tipo Desktop ③ Computador tipo Laptop/Netbook
④ Uso meu celular (telemóvel) ⑤ Combinação (de que?) _____

6 O TCI (computador/telemóvel) que usa fora do curso **tem acesso** à Internet? ① Sim ② Não ③ Não uso nenhum
Em caso que **sim**, você liga à Internet com: ① Modem/Linha fixa ② Modem/WLAN ③ USB (netmóvel) ④ _____

7 Como (fácil/difícil) è **obter acesso** à Internet? .....

Muito difícil	Difícil	Fácil	Muito fácil	Não aplicável
①	②	③	④	⑤

Porquê? _____

8 Quantas as vezes você está a ...

	Nunca	Quase nunca	As vezes	Regular
• comunicar por SMS?	①	②	③	④
• comunicar por e-mail?	①	②	③	④
• comunicar por Chat/iConversa (p.e. Instant Messager, Skype, etc.)	①	②	③	④
• pesquisar na Internet (p.e. usando Google, Yahoo, YouTube)	①	②	③	④
• usar redes sociais no Web como Facebook, MySpace, Hi5, etc.)	①	②	③	④
• usar um computador (fora deste curso aqui no centro)	①	②	③	④
• usar o seu celular para outros fins (fora de fazer/receber chamadas)	①	②	③	④

9 Você está a usar os seguintes TCIs/aplicações para que finalidade?

	Nunca	Pessoal	Escola	Trabalho
• Telefone público (fixo ou telemóvel)	①	②	③	④
• Chamadas pelo telemóvel (seu celular pessoal)	①	②	③	④
• SMS (mensagens electrónicos) pelo telemóvel (seu celular pessoal)	①	②	③	④
• e-mail (correio electrónico) pelo computador ou celular	①	②	③	④
• Pesquisa/Consulta na Internet (pelo computador ou celular)	①	②	③	④
• Redes sociais no Web (como Facebook, MySpace, Blogger, Hi5, ..)	①	②	③	④
• Programas de MS Office (Word, Excel, Powerpoint, etc.)	①	②	③	④
• Jogar jogos (no computador/console/gamebox)	①	②	③	④
• Ouvir e/ou replicar música ou videos/filmes (incl. YouTube, Flickr)	①	②	③	④

Appendix 1a – Original questionnaire (incl. Introduction and consent clause) in Portuguese

Parte 2: Ponto de vista e espectativas de frequentar este curso

10 Como você **tomou conhecimento** sobre a existência do curso de informática (em que participe agora)?

① Família; quem _____ ② Amigo/a ③ Colega na escola/trabalho
④ Informação; onde_____ ⑤ Publicidade do Centro ⑥ Própria iniciativa
⑦ Outra forma (indica fonte): _____

11 A final, que **pessoa** era mais influente para sua decisão de se inscrever neste curso de informática?

① Conversa na família; (quem):_____ ② Conversa entre amigos ③ Uma pessoa que já participou
④ Amigo(s) que participe(m) junto com você ⑤ Outra (indica pessoa): _____

12 Peço que vai lembrar-se o que levou você para pensar e finalmente se inscrever no curso de informática.

Escreve abaixo sobre os seus **motivos** para se envolver neste curso de informática:

_____

_____

13 A sua experiência no curso até hoje corresponde com os seus motívos?

	Fraca	Normal	Bom	Excelente
Os meus conhecimentos e aptidão com TCIs desenvolvem-se	①	②	③	④
O curso corresponde com o quê eu esperava (minha percepção/motívos)?	①	②	③	④

14 Peço pensar sobre as suas **expectativas** que você tem com seu envolvimento num curso de informática.
De que forma se manifestam estas expectativas nos seus (futuros) projectos ou planos?

_____

_____

15 Descreve o seu relacionamento com as novastecnologias (TCIs) :

	Mal/Pouco	Normal	Bom/Muito	Topo/Alta
Como você descreve as suas **experiências** com TCIs (novas tecnologias) ?	①	②	③	④
Como você descreve o seu **interesse** em novas tecnologias (TICs)?	①	②	③	④
O que você pensa sobre a **importância** das TCIs em geral:	①	②	③	④
As TCIs vão ter nos próximos tempos um **impacto** na sua vida dia-à-dia?	①	②	③	④

16 Porquê você decediu dar preferência para um curso com um processo de **aprendizagem estruturada** (com aulas regulares e instrução)? Você comparou e avaliõu esta alternativa também com outras opções? Quais são as vantagens e/ou desvantagens?

_____

_____

_____

17 Numa reflexão final (para hoje) sobre você e seu posicionamento tecnológico :

	Fraca/Baixa	Normal	Importante	Essencial
Como você classifique em geral a **importancia/relevância** do curso para si:	①	②	③	④
Importa obter uma '**aptidão básica'** para dominar os programas "MS Office" para usar dia-em-dia na practica?:	①	②	③	④
Importa ter o **certificado de habilidades**?	①	②	③	④
Importa obter '**conhecimentos**' sobre o computador e as tantas aplicações para usar/beneficiar das potencialidades no 'mundo digital'?	①	②	③	④

18 Quem paga as propínas para os módulos do curso? ① Próprio ② Família ③ Outro fonte: _____

19 Você usa **transporte público** para atender este curso? ① Sim ② Não ③ Uso próprio _____
Quanto tempo leva a deslocação entre casa e Centro? ① > 15 min. ② > 30min. ③ > 45min. ④ > 1h ⑤ 1h + ___m

Appendix 1a – Original questionnaire (incl. Introduction and consent clause) in Portuguese

Parte 3: perfíl do estudante/participante do curso

20 Sexo/genero:
① Feminino
② Masculino

Idade (quantos anos tem):
Tenho _____ anos

Estado (de vida):
① *Vivo com a família (pais) com ___ pessoas (na casa)*
② *Vivo sozinho e parte com ___ pessoas o sítio/casa*
③ *Tenho própria família com ___ membros (na casa)*

21 Informações sobre a sua **educação/formação**, inclusivamente as suas **experiências na escola**

Você vai ainda à escola? ① Sim ② Não
Nível mais alto que você concluiu (até hoje): ____ classe
Outros tipos de formação (profissional) que você concluiu: _____

Você tem/tinha alguma experiência sobre o uso da tecnologia na sua **escola**? ① Sim ② Não
Em caso que **sim**, escreve abaixo exemplos (como p.e. computador, datashow, TV/video, projector, gravador, radio, etc.)

_____

Na escola, o professor deu/da alguma vez **tarefas** onde os alunos são encorrejadas usar novas technologias? ① Sim ② Não
Em caso que **sim**, escreve abaixo exemplos (como p.e. pesquia no internet, produzir textos/desenhos, gravar musica, etc.)

_____

22 Informações sobre **trabalho**, emprego e rendimento
① *Eu trabalho ao 'tempo inteiro' já ____ anos como (ocupação) _____ com rendimento mensal _____Mt*
② *Eu trabalho em regime 'part-time' já ___ anos como (ocupação) _____ com rendimento mensal _____Mt*
③ *Eu não trabalho, mas procuro emprego já desde ___ ano(s)*
④ *Eu não trabalho e (neste momento) não procuro emprego, porquê* _____

23 Informações sobre os seus **gastos** mensáis, com a **mobilidade** e a **communicação**
Num 'bom' mês eu tenho gastos (max.) de _____Mt; eu uso para transporte _____Mt e telemóvel _____Mt.
Num 'mal' mês (pouco dinheiro) gasto (min.) _____Mt; uso para transporte _____Mt e telemóvel _____Mt.

24 Informação socio-cultural e socio-economico – **Habitação:** *Na casa onde vive ..*

Tem âgua de torneira?	Tem energia corrente (Credilec)?	Tem televisão?	Tem telefone fixo?	Tem computador?
① Sim	① Sim	① Sim	① Sim	① Sim
② Não	② Não	② Não	② Não	② Não

Tipo da casa em que vive a família (Tipo # e material de construção): Tipo___, (material _____)

① Construido antes de 1975 (independência) ② Construido pela própria família ③ Aluguer

25 Informação socio-cultural e socio-economico – **Família:** *Na sua família ..*

Em casa dos seus pais fala-se (em uso dia-à-dia) que língua? 1ª língua: _____; 2ª língua: _____

Qual é o nível académico mais alto do chefe da família: ____ classe (ou outra forma _____)

O chefe da família (pai, ou mae, ..) ..
① Trabalha à conta própria no sector de _____
② Trabalha ao 'tempo inteiro' como (ocupação) _____
③ Trabalha ocasionalmente, conforme das possibilidades do mercado de trabalho.
④ Não está a trabalhar, mas procura emprego.

26 *Eu acho sobre este questionário, que foi ....* ① Fácil ② Normal ③ Difícil ④ Muito exigente

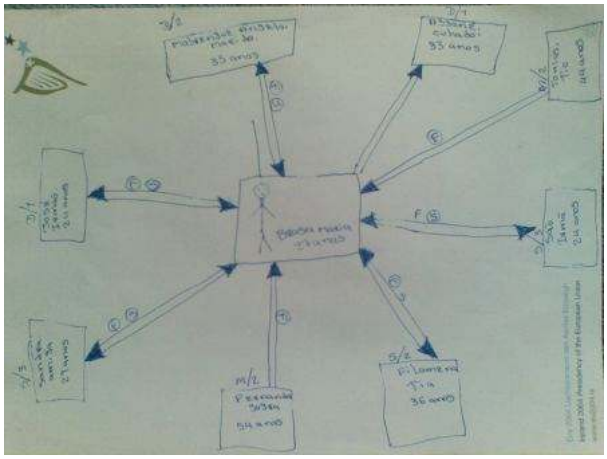
Convite para a participação na 2ª fase da pesquisa

Você está disposto/a para participar numa entrevista (de duração de uma hora) e a seguir a participar numa reflexção em grupo (de duração de uma hora) para aprofundar os dados obtidos neste questionário? A entrevista individual e a reflexão em grupo (em caso que você indicou o seu interesse e se você foi selecionado/a) são previstas durante o mês de Agosto (provavelmente antes ou após duma aula) após confirmação. A confidencialidade dos dados obtidos como também sobre a sua pessoa é garantida. Se você está disposto/a, escreve abaixo os seus dados de contacto. Obrigado.

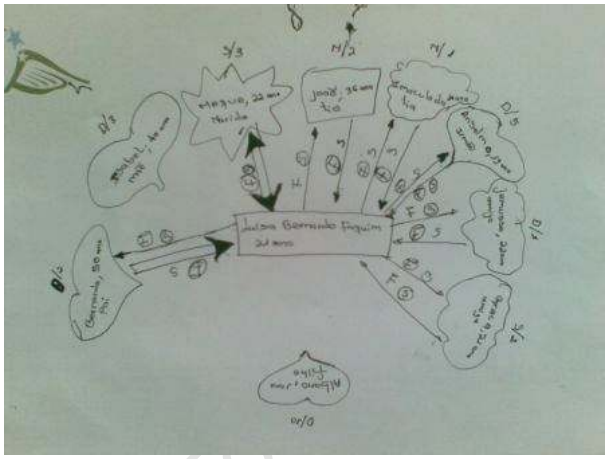
Nome _____ Numero telemóvel (ou e-mail) _____

Appendix 9: Focus group drawings

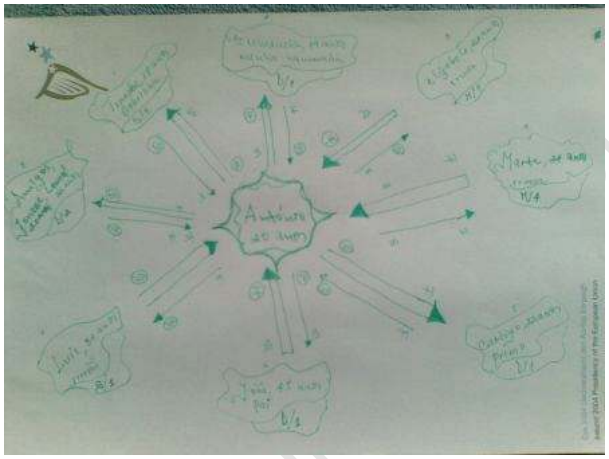
Participants were invited in Phase 3 before the focus group discussion to draw up their personal communication patterns, using criteria of interpersonal importance and social relationship (closest 8 persons), communication frequency (daily, weekly, direction) and way of communication (call, text messaging).



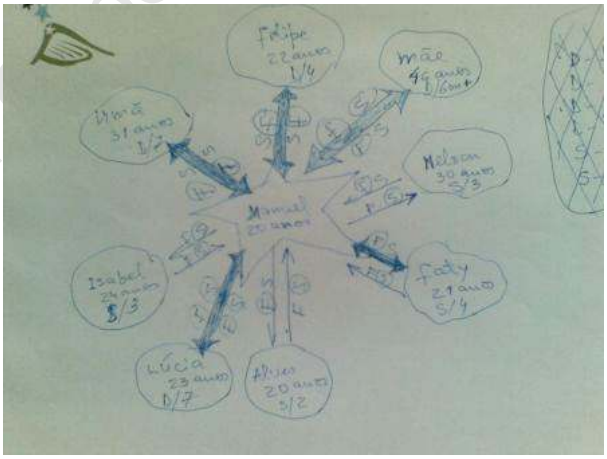
Maria, female, 26 years, married



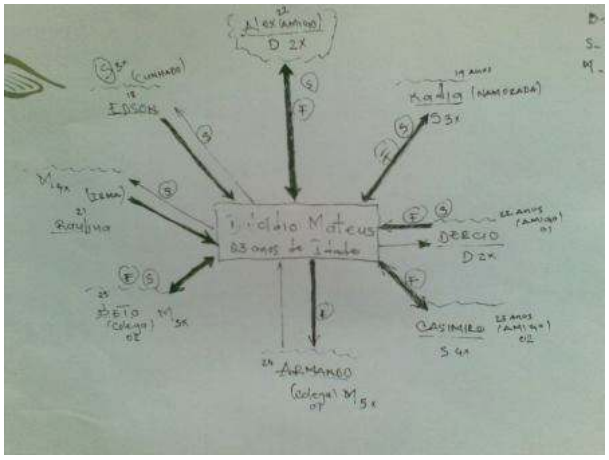
Luisa, female, 21 years, married, 1 child



Antonio, male, 20 years



Manuel, male, 20 years



Mateus, male, 23 years

Appendix 10: Analytical approach to data analysis using AT

RQ	Why do economically and academically disadvantaged young learners choose to engage with ICTs and what role do they see for computer literacy?		
AS	*Questions and problems using AT analysis to answer research questions*	*Reference with data collection (enabling and constraining conditions) and contradictions in the AS*	*Theoretical/analytical concepts and themes*
S	Learners participate in several AS (Course, family, friends, school, etc.) • Where do they come from? • Are different entry levels creating tensions for learners?	• Previous experiences/involvement (technical, socio-cultural, socio-economic) • 2 persons sharing a computer	(Bourdieu) Cultural/Social capital (CC/SC) (Archer) Agency and personal identity (Goode) Technological identity
S	How do they understand learning?	• Learning for life • Teaching/Education experiences (School/Home)	(Bloom) Taxonomy of lower/higher order understanding of learning
S	Does joint activity (expansive learning) become visible in collaborative action?	• Experiences of negotiating new ways of acting together (2 persons sharing a computer)	(Vygotsky) Expansive learning through collaboration
S	What about progress/process of internalisation/externalisation over time?	• Learning in ZPD sparks 'creativity' • Readiness for future application of new skills	(Laurillard) Teaching and learning events (CF)
O	How do course participants with different motives understand the object? • Does different understanding jeopardise collective interaction?	• To obtain a certificate vs. skills acquisition	(Vygotsky) Expansive learning through collaboration
O	Do novice course participants see the computer (tool) more as an object?	• Focus on the interface (to get used to it) • Struggle with technical problems (failure)	(Van Dyk, Warschauer) Digital divide discourse (Goode) Technological identity
O	Does tool-mediated acting on the object over time live up to learners expectations (guided by need/motive relations) while producing some outcome (computer literacy)?	• Concrete next steps/plans based on new learning experience (skills/knowledge)	(Bourdieu) Cultural capital (embodied) (Archer) Concern > project > practice
T	Do learners understand that the computer (tool) mediates action upon object and its relation within an activity (computer can be used for other things, as well as computer can be exchanged to produce similar outcome)?	• Use of tools (Computer to be used differently and alternative tools to produce similar outcome)	(Leontiev) Hirarchical structure (AT)
T	How do learners perceive disruptions (technical failure, internet connectivity) as threat to achieve their goals and outcome?	• Access conditions (hardware, internet)	(Van Dyk, Warschauer) Digital divide discourse (Siemens) Connectivity
T	How do learners express their experiences about the modules 'internet/e-mail' with (LBC) and without (YA) internet connection during their course?	• Practical experiences of learners in both courses to understand progress and/or constraints regarding learning outcome	(Lave, Hedegaard) Situated learning (CoP)
C	How does the CoP (course participants) and wider community (ecological system) interplay with the learner?	• Skilled workforce in MSE crucial for LDCs (productivity and competetiveness) • Technological identity impact on SI	(Bourdieu) Cultural and social capital (Archer) Emerging properties and powers (PI, SI)
DL	Do learners take up different roles through DoL (CoP) and how does this impact on the role of the course instructor to be more effective?	• 2 persons sharing a computer	(Vygotsky) Expansive learning through collaboration (Lave) Situated learning (CoP)
DL	What activities or sub-activities (actions) engaged learners to collaborative interaction?	• Internalisation as process over time does not happen individually at same pace • Practice to use e-mail and social networking (among novice learners with no personal and community experience)	(Vygotsky) Expansive learning through collaboration (Lave) Situated learning (CoP)
R	Do administrative rules (payments) constrain participants to finalise the course (and hence jeopardise the desired outcomes)?	• Risk to abandon or delay the course or obtaining the certificate • Value for money (Socio-economic condition of individual/family in community/LDC)	(Bordieu) Habitus (micro > meso level), EC (Archer) Modus vivendi (Concerns > practice)
R	What in/formal rules learners perceive to facilitate or discourage (collaborative) interactions?	• Instructors handling of rules (as part of perceived performance)	(Laurillard) Teaching and learning events (CF)

(AT) Activity Theory, (AS) Activity System, (S) Subject, (O) Object, (T) Tool, (C) Community, (DL) Division of Labour), (R) Rules, (ZPD) Zone of Proximal Development, (CoP) Community of Practice, (CF) Conversational Framework, (CC) Cultural Capital, (SC) Social Capital, (EC) Economic Capital, (PI) Personal Identity, (SI) Social Identity, (TI) Technological Identity, (MSE) Micro and Small Enterprises, (LDC) Least Developed Country